IMPACT OF JHUM CULTIVATION ON THE ECOSYSTEM OF MANIPUR : A CASE STUDY OF UKHRUL DISTRICT

ABSTRACT
THESIS

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By

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As the pressure of population increased, the hunters-cum-cultivators of the Neolithic period started clearing of more patches in forests to bring them under cultivation. At the depletion of fertility, the cultivators used to migrate to new tracts to burn and clear forests for sowing of crops. This type of cultivation is termed as 'slash and burn agriculture' or 'shifting cultivation' or 'bush fallow agriculture' or 'swidden agriculture' or '*jhum* cultivation'.

Jhum cultivation otherwise called '*Pamlou*' in Manipur may be defined as an agricultural system which is characterized by rotation of fields rather than crops, by short period of cropping alternating with long fallow periods and clearing by means of slash and burn. It occupies a distinct place in the tribal economy and contributes a vital part of the socio-economic network of tribal life in Manipur and particularly in Ukhrul district. This practise of raising agricultural crops does not involve cultivation of land using agricultural implements or draught animals or any mechanical power. The inputs are human labour and seeds. Crops raised for a few seasons and area are abandoned once in 2 or 3 years which are affected by serious erosion. The farmers called *jhumias*, then shift over to other lands and resort to similar practise (but the villages do not shift). Leaching, erosion and loss of fertility takes place rapidly. Land-water system which is basic life supporting factor and a prime mover of socio-economic development has already fallen into the clutches of the law of diminishing returns with reduction of productivity vis-à-vis inputs and gross physical degradation of the system. All this further aggravates the situation and makes the *jhumias* increasingly poor inspite of his putting much greater labour.

Logically, *jhum* cultivation is an agricultural problem which creates forest and soil erosion problems, leading to destruction of flora and fauna and finally eco-degradation. The pernicious effect of *jhuming* has been increasing and have now assumed a devastating proportion. Several hillsides of Manipur have become barren – slopes with rills and gullies without vegetation. The eroded soil from the upper reaches fills up the streams and reservoirs where siltation takes place. Due

to decrease in the water depth in the lakes/reservoirs, life of hydro-electric projects like Loktak Hydro-Electric Project is going to be shortened. Drying of many perennial sources of water also takes place. On the other hand, floods occur more often now than before and quality of environment is being seriously affected. Ecological balance of the whole region is being endangered.

On the other hand, the practise of *jhum* cultivation has been severely attacked by the ecologists, environmentalists and planners as it disturbs the ecosystem causing ecological imbalances. There are, however, some people who support the continuance of *jhuming* with necessary and effective reforms.

Keeping this significant background of *jhum* cultivation in mind, it was decided to study the impact of *jhum* cultivation on the ecosystem of Manipur. Ukhrul district of Manipur is selected for this study because of its mountainous topography, undulating slopes and wet weather conditions that provides ideal conditions for *jhum* cultivation; the predominant tribal population mainly Nagas and Kukis who are the main *jhum* cultivators in Manipur and they have been practising *jhum* for centuries; absence of industries and minimum urbanization, abject of poverty, unemployment, economic exploitation, social deprivation, poor health, illiteracy and lack of infrastructure.

The main objectives of this study is to assess the physical, socio-economic setting and the nature of agriculture practised in Manipur, to examine the nature of *jhum* cultivation, the socio-economic conditions of the sampled *jhumias*, and to assess the impact of *jhum* cultivation on the ecosystem of Ukhrul district, to suggest the measures for sustainable development of this region.

The author has made extensive use of primary data which was drawn from comprehensive survey of five sampled villages, each lying in different tribal development blocks and inhabited by different tribes living in Ukhrul district.l From the five sampled villages, about 10 to 100 percent sampling of *jhumia* households was done. Survey was done with the help of questionnaire (survey of different blocks of Ukhrul district, survey of the sampled villages of Ukhrul

district, survey of the sampled *jhumia* households in Ukhrul district) during 2001 and 2002.

The present work is divided into three parts and spreads over six chapters. It starts with an introduction. Part one examines the physical and socio-economic setting and the nature of agriculture practised in Manipur. In part two, *jhum* cultivation and the socio-economic conditions of the *jhumias* in Ukhrul district has been examined. Part three deals with the crux of the problem to be investigated that is impact of *jhum* cultivation on the ecosystem of Ukhrul district.

Part one spreads over three chapters. In chapter one an attempt is made to study the physical setting of Manipur. Due to hilly nature of the terrain, undulating slopes and wet weather conditions at least for seven months (April to October) provide conditions in which tribals are practising *jhum*. In chapter two an attempt has been made to assess the socio-economic setting of Manipur. Ukhrul district is a land of beautiful mountains interspersed by numerous tribal habitats. Of the total population of this district, nearly 94 per cent comprises of tribal population. These tribals are traditionally bound and they practise primitive agriculture. Jhum is a way of life for them. It has deeply embedded in their lifestyle. They practised it for their livelihood. Thus, their needs, food habits, self-reliance, folklores, festivals and overall cultural ethos have a say in *jhum*. Chapter three is devoted to study the nature of agriculture in Manipur. The tribals living in the hills have to face difficulties of mountainous terrain, steep slopes (98 per cent of the total area), poor soils, heavy rains, less invigorating climate, mosquito infestations, poor means of transport and communication and a life of isolation. As a result he is compelled to adopt a primitive mode of cultivation that is *jhuming*. In valley regions people adopted advanced type of agricultural practices using tractors, irrigation, HYV of crops, pesticides and insecticides etc. But in the hill regions where *jhum* is practising, no irrigation and modern inputs are used.

Part two spreads over two chapters i.e., chapter four and chapter five. Chapter four deals with *jhum* cultivation in Ukhrul district. Recent figures for area under *jhum* is not available. So the figures which are available have been considered. In 1986-87, 99,162 hectares and in 1993-94, 162,547 hectares were under *jhum*. This shows that Ukhrul district has recorded an increase of 13.95 per cent area under *jhum* during the last eight years (till 1993-94). The area under secondary forest has decreased by 13.94 per cent. This shows that the amount of increase in area under *jhum* is the amount of decrease in area under forests. Thus, in 1986-87, 75.00 per cent of the total area was under forest while 21.82 per cent area was under *jhum* with only 3.13 per cent area under current *jhum*. But in 1993-94, the area under mixed forest and *jhum* were 61.06 per cent and 35.77 per cent respectively with 1.86 per cent area under total *jhum* category has increased, the area under current *jhum* decreased from 3.13 per cent in 1986-87 to 1.86 per cent in 1993-94.

Slope analysis of the different micro-watersheds showed that 81.58 percent of the total area falls in the very steep slope category, 16.28 per cent falls in the moderately steep to steep slope category and 1.43 per cent lies in the strongly sloping slope category. Inspite of this fact that Ukhrul district is characterized by hilly terrain and very steep slopes where soil erosion intensity is very high, *jhuming* is still practised and it is a way of life for the tribals. Fifth chapter deals with the socio-economic conditions of *jhumias*. The results of comprehensive survey of the five sampled villages of Ukhrul district throws light on the following facts:

The land tenurial system differs from Tangkhul Naga inhabited vilalges to Kuki inhabited villages. In Tangkhul Naga inhabited villages the individual jhumias have partially their own rights while in Kuki inhabited villages the headman has a say in all the matters.

Surveys have shown that cropping period is of one year in the Tangkhul Naga inhabited villages and three years in Kuki inhabited villages. *Jhum* cycle

also differs from one village to another. In Lungphu village, 15 years *jhum* cycle is still maintaining. In Yeasom village, it is 9-10 years and in Nungbi Khullen village it ranges between 5 to 10 years. Whereas in Kuki inhabited villages, it is of 7 years in Maku Kuki and 5 years in Mongkot Cepu village. Man-land ratio in Tangkhul Naga inhavited villages are 1:0.32 in Yeasom village, 1:0.28 in Lungphu village and 1:0.28 in Nungbi Khullen village. Whereas in Kuki inhabited villages it is 1:0.24 in Maku Kuki and 1:0.16 in Mongkot Chepu village. Again man-jhum land ratio are 1:0.26 in Lungphu, 1:0.25 in Yeasom and 1:0.13 in Nungbi Khullen village. Whereas, in Maku Kuki and Mongkot Chepu, it is 1:0.24 and 1:0.16 respectively. Labour-production ratio in the Tangkhul Naga villages was 1:6000 in Yeasom, 1:4514 in Lungphu and 1:2166 in Nungbi Khullen village while in Kuki inhabited villages it 1:5414 in Maku Kuki and 1:2051 in Mongkot Chepu village. Thus, average labour-production ratio in the Tangkhul Naga inhabited villages is about 1:4227 whereas, in the Kuki inhabited villages it is about 1:3733.

Part three presents the crux of the matter to be investigated. This part comprises of chapter six only. In this chapter an attempt has been made to assess the impact of *jhum* of the ecosystem of Ukhrul district. In the five sampled villages of Ukhrul district, a total of about 452.51 acres of forest has been lost. Average area of forest lost in these five villages in 90.51 acres. In the whole Ukhrul district where 222 villages are practising *jhum*, a total of about 20,093 acres or 8,135 hectares of forest is being cut down per year for the purpose of *jhum*.

In the process of *jhuming*, 3.7 tonnes of soil materials per hectare was reported to slide down the foot hills. It was also reported that soil erosion from hill slopes (60-70%) under first year, second year, abandoned *jhum* (first year fallow) and bamboo forest were estimated to be 146.6, 170.2, 30.2, and 8.2 tonnes per hectare per year respectively.

Soil samples were collected from each of the five sampled villages before and after burning and tested to assess the fertility status. More or less same results were observed in all the soil samples that were tested from different *jhum* sites. pH value of the soil increased slightly in all the sampled soils after burning. Percentage of organic carbon in the soils decreased after burning. The quality of potassium increased substantially after burning. While the amount of phosphorus in Kg. Per hectare is more or less same before and after burning.

In some spots certain trees and shrubs are scarce and may become further rare or even eliminated from the flora of the region e.g. Phoebe hainesiana, Alder, Pinus Kerya and Parkia Javanica etc. are becoming scarce in most of the areas of Ukhrul district. Many parasites and epiphytes also gets depleted or eliminated. Respondents from the five sampled villages reported of disappearance of many wild life from their area and neighbouring areas. The Javan Rhinoceros and Wild Ox of Myanmar known as '*Santhou*' in Manipuri have vanished from Manipur forever. The Hoolock Gibbon, Stump Tailed Macaque, Slow Loris, Clouded Leopard, Golden Cat, Marbled Cat, Binturong, Spotted Linsang etc. are making precarious existence and all of them are on the verge of extinction. Similar is the case of birds. A number of birds also have become rare and many are probably extinct.

Regularity of rainfall has also been adversely affected by degradation of forest for *jhum* purpose. As a result floods and droughts are becoming a regular phenomena. Magnitudes of these phenomena are also increasing. Floods which occurred in 2001 and 2002 were among the most hazardous one which affected almost the whole valley districts of the state. Drought, on the other hand, had never been a frequent phenomenon, but very severe drought was experienced in 1999 resulting scarcity of water and drying up of many rivers. Sediments brought down b y the rivers have led to the sedimenatation on the floor of rivers and Loktak Lake. Due to decrease in the depth of Loktak Lake the life style of the people living in and around the lake has been changing.

Much has been written, much has been told and much hue and cry has been made over the degradation of the ecosystem due to *jhuming*. Yet, *jhuming* continues.In the coming years, with higher growth population the demand of food crops will increase. This will intensify *jhuming* if no alternate measures are undertaken.

Any transformation in *jhum* should be socially acceptable, economically profitable and ecologically sustainable. Any delay in implementation of better techniques will lead to converting the whole area under *jhum* into an ecologically slum.

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Certificate

*This is to certify that the thesis "**Impact of Jhum Cultivation on the Ecosystem of Manipur: A Case Study of Ukhrul District**" by **Mr. Md. Bahar-Ud-Din Shah** is a original research work of the candidate, and is suitable for submission for the award of the Degree of Doctor of Philosophy.*

Dated: 21st June, 2003

Prof. (Mrs.) Abha Lakshmi Singh
(Supervisor)

Dedicated

To My

Loving Parents

Who Stimulated me to Visualize
the Changing Social Mileau

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GLOSSARY

Local Words	English equivalent
Purvanchal	A local name of the eastern arm of Himalaya
Papaya	A fruit
Jhuming/jhum/jum	Shifting cultivation
Ladang, Caingin, Milpa, Ray, Conuco, Roca, Masole, Podu, Dadi, Koman, Bringa, Kumari, Watra, Penda, Bewar, Dahia, Deppa, Kumari	Local or regional name of shifting cultivation
Yoke	A traditional agricultural implement
Dao	A traditional agricultural implement (machetes)
Kharif	Summer (a term used in agricultural practices)
Rabi	Winter (a term used in agricultural practices)
Jungle	Forest
Pakhangba	The first mythological king of Manipur
Sidaba Mapu	Supreme God
Jhumia/jhumias	Shifting cultivators/farmers
Kuccha	which is not cemented
Pucca	which is cemented
Tin	A container (mustard oil tin) which is used to measure the quantity of paddy/rice
Sangam	A local land unit system which is roughly equal to 0.62 acre.

INTRODUCTION

As the pressure of population increased, the hunters-cum-cultivators of the Neolithic period started clearing more patches in forests to bring them under cultivation. At the depletion of fertility, the cultivators used to migrate to new tracts to burn and clear forests for sowing of crops. This type of cultivation is termed as 'slash and burn agriculture' or 'shifting cultivation' or 'bush fallow agriculture' or 'swidden agriculture'.

Shifting cultivation is called by different names in different parts of the world. It is variously termed as *Ladang* in Indonesia, *Caingin* in Philippines, *Milpa* in Central America and Mexico, *Ray* in Vietnam, *Conuco* in Venezuela, *Roca* in Brazil and *Masole* in Congo and Central Africa. It is also practised in highland areas of Manchuria, Korea and south west China. In North East India it is known as *Jhum* or *Jum*, in Orissa as *Podu*, *Dabi, Koman* or *Bringa*, in Western Ghats as *Kumari*, in Rajasthan as *Watra,* in Madhya Pradesh as *Penda, Bewar* or *Dahia* and in Chattisgarh as *Deppa* and *Kumari.*

Jhum cultivation otherwise called '*Pamlou'* in Manipur may be defined as an agricultural system which is characterised by rotation of fields rather than crops, by short period of cropping alternating with long fallow periods and clearing by means of slash and burn. The operation of *jhum* cultivation is associated with systematic processes like selecting the forested hilly land, clearing the forested tract by cutting down the *jungles*, burning the dried forest into ashes, worship and sacrifice, dibbling and sowing of seeds, weeding, watching and protecting the crops, harvesting, threshing and storing, merry making and fallowing. This practise of raising agricultural crops does not involve cultivation of land using agricultural implements or drought animals or

any mechanical power. The inputs are human labour and seeds. Crops raised for a few seasons and areas are abandoned once in 2 or 3 years which are affected by serious erosion. The farmers called *jhumias*, then shift over to other lands and resort to similar practise (but the villages do not shift). Leaching, erosion and loss of fertility takes place rapidly. Land-water system which is basic life supporting factor and a prime mover of socio-economic development has already fallen into the clutches of the law of diminishing returns with reduction of productivity vis-a-vis inputs and gross physical degradation of the system. All this further aggravates the situation and makes the *jhumias* increasingly poor inspite of his putting much greater labour.

Jhum cultivation, generally in Manipur and particularly in Ukhrul district occupies a distinct place in the tribal economy and contributes a vital part of the socio-economic network of tribal life. They clearly do it for their food requirements. The land around the village within certain fixed bounds is usually the property of the village, though the system of ownership of land differs from village to village particularly in Ukhrul district. In the midst of sharp relief, gentle slopes are used for terracing, in the absence of which, the land is put under *jhum*. According to the prevailing customs in the hills, all land adjoining the village belongs to the community as a whole or to the village headman and exclusive right of an individual is not entertained. The site of *jhum* is selected by the headmen or priest with the help of other aged experienced *jhumias* in advance and individual families are alloted their share if there is no any already marked particular field of particular family. In some Tangkhul Naga villages of Ukhrul district, the roughly marked permanent *jhum* fields are available for particular families. In such situations, there is no new allotment of land in the

particular *jhum* year, if the land is enough to feed the family otherwise one could demand for more *jhum* land. *Jhumias* start, after selection of *jhum* site, the labour intensive processes of *jhum* with cutting down the trees in the month of December with *Dao* and Axe. After felling the forest, the wood and twigs are allowed to dry, so that it may be fired in the month of March when the weather is sunny and overcast skies are rare. The uncontrolled fire, in many cases spreads beyond the *jhum* area and does great damage to the valuable virgin forests of the region. The soil for a depth of one or two inches gets completely burnt. The soil is, thereafter, scratched up with little hoe and in this process the soil and the ash gets mixed up together.

Logically, *jhum* cultivation is an agricultural problem which creates forest and soil erosion problems. Soil erosion takes place due to dynamic processes of nature and other natural factors. This has been further aggravated by human interference by way of *jhum* cultivation, indiscriminate cutting and felling of trees for fuel and timber, free grazing of cattles, unscientific cultivation of crops on the steep slopes, etc. leading to destruction of flora and fauna and finally eco-degradation.

The pernicious effect of *jhuming* has been increasing and have now assumed a devastating proportion. Several hill sides of Manipur have become barren-slopes with rills and gullies without vegetation. The eroded soil from the upper reaches fills up the streams and reservoires where siltation takes place. Due to decrease in the water depth in the lakes/ reservoires, life of hydro-electric projects like Loktak Hydro Electric Project is going to be shortened. Drying of many of the perennial sources of water also takes place. On the other hand,

floods occur more often now than before and the quality of environment is being seriously affected. Ecological balance of the whole region is being endangered.

The mountainous topography, undulating slope surrounding the Manipur valley and wet weather for over seven months (April to October) provides ideal conditions in which people are practise *jhum* cultivation. The people who are scattered over the mountains depend for their sustenance on *jhum*ing and food gathering from the forest. All the hill districts are most sparsely populated having a density of about 49 persons per sq. km. as against the density of 628 persons per sq.km. in the central valley. The hill man has to bear with steep slope, poor soils, mosquito infested and less invigorating climate, poor means of transport and communication and a life of isolation and relative isolation. Under such an adverse physico-socio-cultural environment his life is that of a desperate struggle for survival. Consequently, he is compelled to adopt a primitive mode of cultivation on the undulating slopes of the surrounding hills of Manipur.

On the other hand, the practise of *jhum* cultivation has been severely attacked by the ecologists, environmentalists and planners as it disturbs the ecosystem causing ecological imbalances. There are, however, some people who support the continuance of *jhum*ing with necessary and effective reforms.

Keeping this significant background of *jhum* cultivation in mind, it was decided to study the impact of *jhum* cultivation on the ecosystem of Manipur. Ukhrul district of Manipur is selected for this study because of its mountainous topography, undulating slopes and wet weather conditions that provides ideal conditions for *jhum* cultivation; the predominant tribal population mainly Nagas and Kukis who are the main *jhum* cultivators in Manipur and they have been

practising *jhum* cultivation for centuries; absence of industries and minimum urbanization (whole district came under the rural category both in 1991 and 2001 Census), abject of poverty, unemployment, economic exploitation, social deprivation, poor health, illiteracy and lack of infrastructure.

Objectives:

The main objectives of this study are:

1. To assess the physical setting of Manipur - Ukhrul district in particular i.e. geology, relief, drainage, climate, soils and natural vegetation.

2. To assess the socio-economic setting of Manipur -Ukhrul district in particular i.e. population, tribes, economic structure etc.

3. To assess the nature of agriculture practised in Manipur - Ukhrul district in particular i.e. agricultural systems, agriculture in the valley districts, agriculture in the hill districts, historical background of *jhum*ing and distribution and nature of *jhum*ing.

4. To examine *jhum* cultivation practised in Ukhrul district-land use pattern, area under *jhum* cultivation, extension in *jhum* area from 1986-87 to 1993-94, land use and land cover changes and analysis of slope.

5. To examine the socio-economic conditions of the sampled *jhumias* in Ukhrul district – case studies from Lungphu village, Yeasom village, Nungbi Khullen village, Mongkot Chepu village and Maku Kuki village - land tenure, cropping period and *jhum* cycle, man - land ratio, labour production ratio and resultant socio-economic conditions.

6. To assess the impact of *jhum* cultivation on the ecosystem of Ukhrul district - forest loss, soil erosion, loss of soil fertility, loss of flora, loss of fauna, changes in hydrological processes etc.

7. To suggest measures for sustainable development of this region.

Data Base:

The data were collected both from primary and secondary sources.

Collection of primary sources of data in Manipur – Ukhrul district in particular was a very hard task because of the difficult terrain, insurgency, lack in transport and communication facilities, inaccessibility, less invigorating climate, etc. Still the author has conducted field surveys to collect primary data through:

1. Survey of the different blocks of Ukhrul district.

2. Survey of the sampled villages in Ukhrul district

3. Survey of the sampled *jhumia* households in Ukhrul district.

The survey was conducted on the basis of questionnaire interviews (Appendix I). The field work was done during the years 2001 and 2002. For getting accurate information the sampled villages and *jhumia* households were visited frequently.

Data from secondary sources have been collected from various government bulletins and offices of Manipur and Shillong (Meghalaya).

1. District Census Handbook of Ukhrul district (1991) published by Directorate of Census Operation, Manipur.

2. Statistical Handbook (1990) and Statistical Abstract of Manipur (2001) published by Directorate of Economics and Statistics, Manipur.

3. Basic statistics of North Eastern Region (2000) published by North Eastern Council, Shillong.

4. Soil Bulletin from Department of Horticulture and soil conservation, Manipur.

5. Vana Prani Saptah (1997 and 2000) and Statistical Bulletin (1997-98) published by Forest department, Manipur.

6. Published papers of Department of Agriculture, Manipur.

7. Published papers and bulletins of Indian Council of Agricultural Research, Imphal, Manipur.

8. Satellite imagery based maps and datas provided by Manipur Remote Sensing Application Centre, Imphal.

9. Numbers of published papers and bulletins from Indian Council of Agricultural Research, Barapani, Shillong, etc.

Recent secondary data is not available. So the thesis is based on whatever recent data available on the particular aspect.

Methodology:

The following methods have been used in the present study:

1. Changes in landuse pattern and area under *jhum* cultivation were examined with the help of satellite imagery based datas and maps of 1986-87 and 1993-94 (Landsat TM, 1986-87 and IRS-1B, 1994).

2. The standard classification of landuse / landcover developed by National Remote Sensing Agency (NRSA), Hyderabad has been applied for classifying the landuse of Ukhrul district .

3. A questionnaire (Appendix-1) was developed for assessing the physico-socio-economic conditions of the *jhumias*. The questionnaire used in this study was developed with the help of questionnaires used in similar studies. The questionnaire was designed precisely and vividly so that the respondents could help the researcher without suspicion and hesitation.

4. Data for assessing the socio-economic conditions of the *jhumias* were drawn from a comprehensive survey of 5 villages, each lying in different tribal development blocks and inhabited by different tribes living in Ukhrul district. The sampled villages Lungphu, Yeasom and Nungbi Khullen are inhabited by Tangkhul Naga tribes, while Mongkot Chepu and Maku Kuki villages are inhabited by Kuki tribes. Out of the total 222 villages in Ukhrul district, only 5 villages were sampled because of inaccessibility, bad roads, lack of transport, difficult terrain, tribal population, insurgency etc. The author conducted the survey by foot and went around the villages walking. Conducting survey and gathering information in the tribal dominated villages is very difficult.

5 From the 5 sampled villages, about 10 to 100 percent sampling of *jhumia* households was done to gather information for indepth study. In Lungphu village, of the total 73 households, 8 households (10.95%) were sampled, in Yeasom village, of the total 46 households, 8 households (17.39%) were sampled. In Nungbi Khullen village, of the total 186 households, 21 households (11.29%) were sampled. In Mongkot Chepu village, of the total 104 households, 12 households (11.53%) were sampled and in Maku Kuki village, of the totals 6 households, all the 6 households (100%) were sampled.

6 For assessing the impacts of *jhum* cultivation on the forest cover, water resources, soil erosion, soil fertility, flora and fauna was done by collecting information from the 5 sampled villages.

7 For assessing the loss of soil fertility soil samples were collected from the *jhum* fields before and after burning and tested at the Soil Testing Laboratory of Indian Council of Agricultural Research, Imphal, to assess the pH value, organic carbon, phosphorus and potash.

8 Simple percentages were calculated for easy understanding of the data.

Hypothesis:

The following hypothesis is to be tested:

1. The mountainous topography, undulating slopes and wet weather almost all the year round provides ideal conditions in which people practise *jhum*ing.

2. Under such adverse physico-socio-cultural environment the life of the inhabitants is that of a desperate struggle for survival. As a result they are compelled to adopt *jhum*ing.

3. *Jhum*ing is a way of life for the tribals. The terrain, the climate, folklores, festivals, food habits, needs and the overall cultural ethos has a say in *jhum*.

4. With the increase of population and decrease of *jhum* cycle, there is an increase in degradation of the ecosystem.

Chapter Scheme:

The present work is divided into three parts and spreads over six chapters. This work starts with an introduction. Part one examines the physical and socio-economic setting and the nature of agriculture practised in Manipur. In part two, *jhum* cultivation and the socio-economic conditions of the *jhumias* in Ukhrul district has been examined. Part three deals with the crux of the problem to be investigated that is impact of *jhum* cultivation on the ecosystem of Ukhrul district.

Part one comprises of three chapters. In chapter one, an attempt has been made to study the physical setting of Manipur i.e., geology, relief, drainage, climate, soils and natural vegetations. In chapter two an attempt has been made to assess the socio-economic setting of Manipur i.e., population, types of tribes, economic structure in which horticulture, livestock and fisheries, mineral and power resources, industry, transport and communication and occupational structures has been studied. Chapter three is especially devoted to nature of

agriculture in Manipur, in which agricultural systems, historical background of shifting cultivation in Manipur and nature and distribution of shifting cultivation or *jhum*ing has been examined.

Part two is devoted to the study area i.e., Ukhrul district. Indepth geographical information, land use pattern, *jhum* cultivation and socio-economic conditions of *jhumias* has been taken into account. This part spreads over two chapters i.e., the fourth and the fifth chapter. Fourth chapter deals with *jhum* cultivation in Ukhrul district, in which land use pattern, area extension under *jhum* cultivation in 1986-87 and in 1993-94 has been discussed. Then, land use and land cover changes are detected with comparing two times land use data. Slope analysis has also be done. Fifth chapter deals with socio-economic conditions of *jhumias*. In this chapter all 5 sampled villages are discussed separately taking into account the land tenure, cropping period and *jhum* cycle, man-land ratio, labour-production ratio and resultant socio-economic conditions.

Part three presents the crux of the matter to be investigated. This part comprises of chapter six only. In this chapter an attempt has been made to assess the impact of *jhum* on the ecosystem. The following factors have been taken into consideration i.e., loss of forest, soil erosion, loss of soil fertility, loss of flora, loss of fauna and changes in hydrological processes.

Finally, a brief conclusion based on the results obtained has been presented and a few suggestions are given for the betterment of the *jhumias* and sustainable development of *jhum* areas.

PART - I

M A N I P U R

CHAPTER - I

PHYSICAL SETTING OF MANIPUR

Manipur is an isolated hill girt state in the North Eastern corner of India along the Indo-Myanmar border with Imphal, a flower on the lofty heights (Evans et.al, 1960), as the state capital. It extends from 93°03' to 94°47' east longitudes and 23°50' North to 25°41' north latitudes. It is centrally located on the eastern arm of the Himalayas - the *Purvanchal* (Chatterjee, 1965), which separates India from Myanmar. The state is almost rectangular in shape with a fertile alluvial plain in the centre surrounded by hill ranges on all sides. It is bordered on the north by Nagaland, on the east by Myanmar, on the south partly by Mizoram, and the Chin hills of Myanmar and on the west by Cachar district of Assam (fig.1.1).

Manipur spreads over an area of 22,327 sq.kms. and has a population of 2,388,634(Census of India,2001). It has about 0.68 percent of the country's land and 0.23 percent of the country's population.

The boundary line is approximately 854 kms. Out of which, 532 kms. is the International boundary line with Myanmar in the east. Politico-administratively, Manipur comprises of nine districts namely, Imphal East, Imphal West, Bishnupur and Thoubal districts which lies in the central valley and Senapati, Ukhrul, Chandel, Churachandpur and Tamenglong districts which lies in the hill areas. These districts have been further sub-divided into 37 subdivisions and 38 community tribal development blocks. Table 1.1 shows the politico-administrative structure of Manipur.

Table 1.1: Politico-administrative structure of Manipur

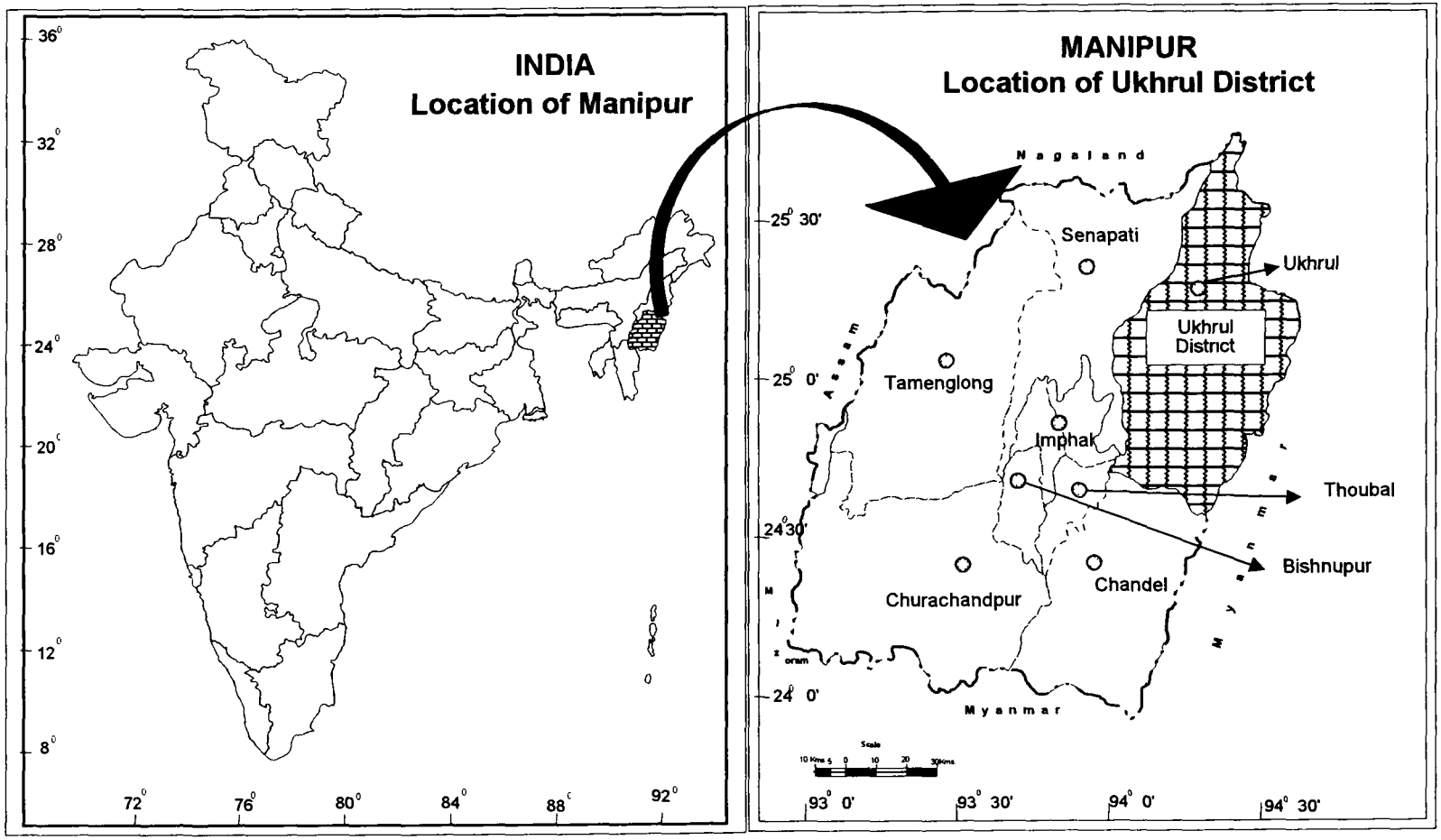
Sl. No.	Districts	Area (sq.km)	Population	Number of				
				Sub-Divisions	CD/TD Blocks	Zilla parishads Auto.District Council	Inhabited Villages	Towns
1.	Imphal East	670	393,780	4	4	1	206	3
2.	Imphal West	558	439,532	4	4	1	117	10
3.	Thoubal	514	366,341	3	3	1	87	9
4.	Bishnupur	496	205,907	3	3	1	45	7
5.	Senapati	3,271	379,214	5	5	2	516	-
6.	Tamenglong	4,391	111,493	4	4	1	193	-
7.	Churachandpur	4,570	228,707	5	6	1	504	1
8.	Chandel	3,313	122,714	4	4	1	292	1
9.	Ukhrul	4,544	140,946	5	5	1	222	-
Total valley		2238	1,405,560	14	14	4	455	29
Total Hill		20,089	983,074	23	24	6	1,727	2
Total Manipur		22,327	2,388.634	37	38	10	2,182	31

Note. (i) Area and Population figures are based on 2001 Census
(ii) Other figures are based on 1991 Census

Source: Census of India, 1991 and Census of India, 2001 (Provisional), Directorate of Census Operations, Manipur.

Manipur consists of an oval, beautiful fertile valley in the centre which is surrounded on all sides by the Manipur Hills. Structurally, the region forms the central segment of the tertiary foldings on the eastern rampants of the country. The hill ranges of Manipur and the enclosed intermont basin - the Imphal Valley, belongs to the Alpine system and the Barak basin on the western margin, to the sedimentary cover. The state, thus, falls into three landform divisions - the Manipur hills, the Manipur valley and the Barak basin, which differ to much extent in their physical characteristics. In this chapter an attempt is made to assess the physical setting of Manipur. This state lies in isolation and is politically disturbed state of India. People know little about this

Manipur : Locational Setting



Source: Census Atlas, India 2001, Registrar General and Census Commissioner, Govt. of India

Fig. 1.1

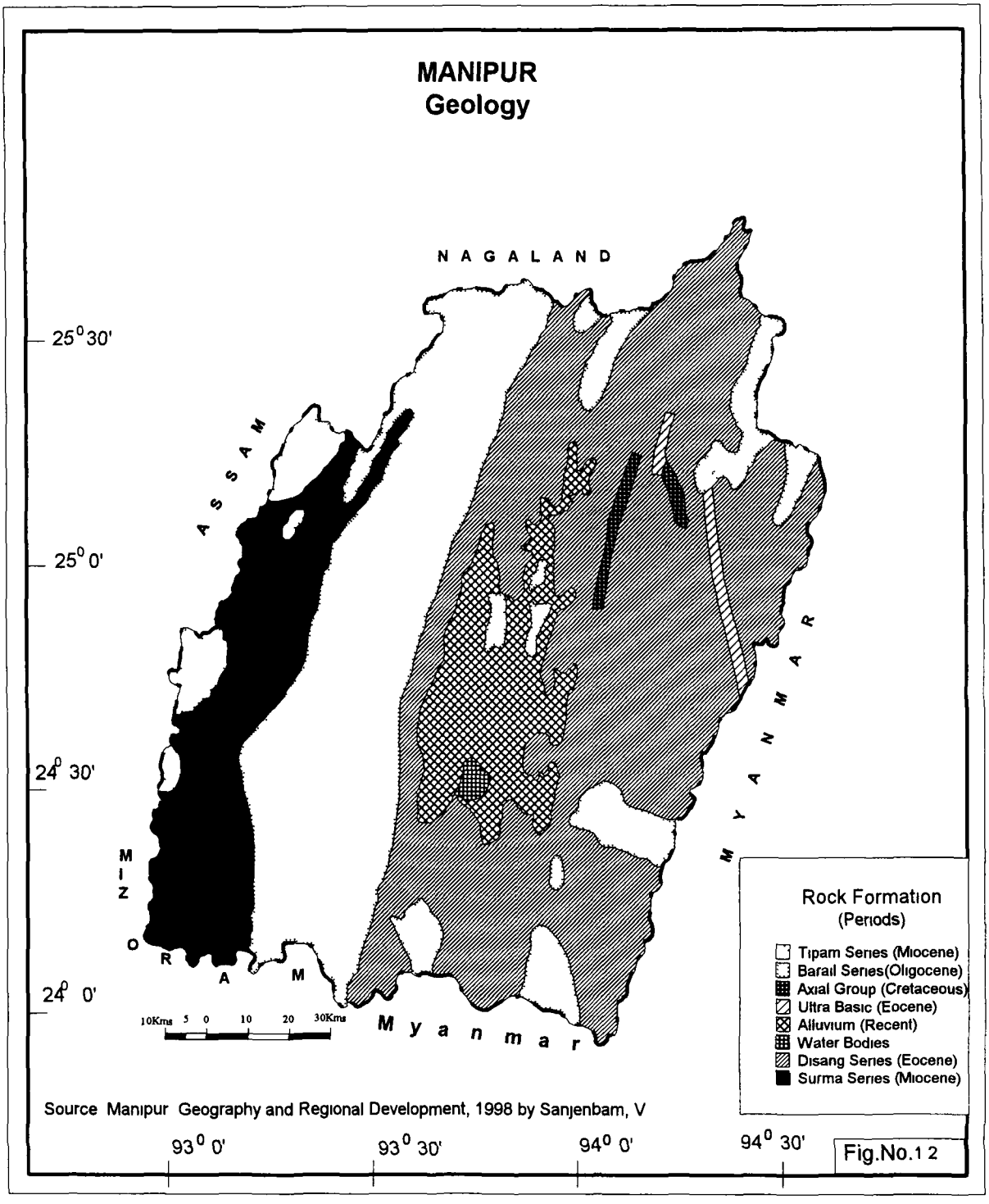
state. So it was thought worthwhile to add a chapter on it. This chapter forms the foundation of the research study. This chapter is based on secondary source of data.

1.1: Geology

The state has a sketchy geological knowledge. Detailed geological survey reports are still awaited. In the early pleistocene age or quarternery period during Cenozoic era, some 55 million years ago, the whole region was uplifted from the sea of Tethys to its present position. This is confirmed from the recent findings of the Geological Survey of India (Amrita Bazar Patrika, 14.1.1989). According to the Geologist of the Burma Oil Company, 'the term axial was described for the rocks which are older than Disang, probably cretaceous and the tertiary rocks in Manipur'. Thus, rock formations found in the state reveal the geological history to some extent. Five rock groups can be identified in the state (fig.1.2).

1. Ukhrul limestones, found in a small narrow belt in the north eastern part, were formed during the cretaceous period, about 80 to 90 million years ago, where limestone occurs as lenses in a sequence of gritty sandstone and buff to grey coloured shale.

2. The Disang group, spreads over the eastern half of the state, was deposited in the middle and lower Eocene period. It consists of a monotonous sequence of dark grey shales with thin mudstone, siltstone and sandstone towards the west and of sandstone, buff-coloured shales and siliceous limestone towards the east.


MANIPUR
Geology
NAGALAND
ASSAM
MIZORAM
MYANMAR
Myanmar
25° 30'
25° 0'
24° 30'
24° 0'
93° 0'
93° 30'
94° 0'
94° 30'
10Kms 5 0 10 20 30Kms
Rock Formation
(Periods)
Tipam Series (Miocene)
Barail Series(Oligocene)
Axial Group (Cretaceous)
Ultra Basic (Eocene)
Alluvium (Recent)
Water Bodies
Disang Series (Eocene)
Surma Series (Miocene)
Source Manipur Geography and Regional Development, 1998 by Sanjenbam, V
Fig.No.1 2

3. The Barail group of rocks, covering the major portion of western Manipur, were formed some 25 to 40 million years ago in the upper Eocene and Oligocene periods. With abundance of carbonaceous materials, it is of considerable economic importance. It consists mostly of well-bedded sandstones, clays and shales.

4. The Tipam and Surma groups of rocks, deposited in the Miocene period about 18 to 25 million years back, cover the western flanks of the region in the Barak drainage area. Representing argillaceous and arenaceous sequences in their formation, these rocks contain sandy shales, sandstones, mudstones, clay and conglomerates.

5. The Imphal valley alluviums, deposited in the Central Valley, are of recent origin formed within the last 10,000 years. These alluviums with a thickness of 200 to 300 metres over the underlying Disang shales, contain clay, sand, sandy clay, silt and shingle.

1.2: Relief

Manipur has a multi-topographic characteristic. The eastern wing of the Himalayas, especially its lower hills, constitute an important feature of the landscape of Manipur. The hills form one of the three main physical regions of the state, the other two being the Manipur valley, in which the state capital, Imphal is situated, and the Barak plain on the western frinze of the state (fig.1.3).

The Manipur hills consist of a series of parallel ranges extending between the Naga hills in the north and Mizo and Chin hills in the south. Having a general slope towards the south, these hills extend from north-east to south-west direction. These hills broadly fall into two groups - the Manipur eastern hills and the Manipur western hills, which differ too much extent in their layout, structure and relief.

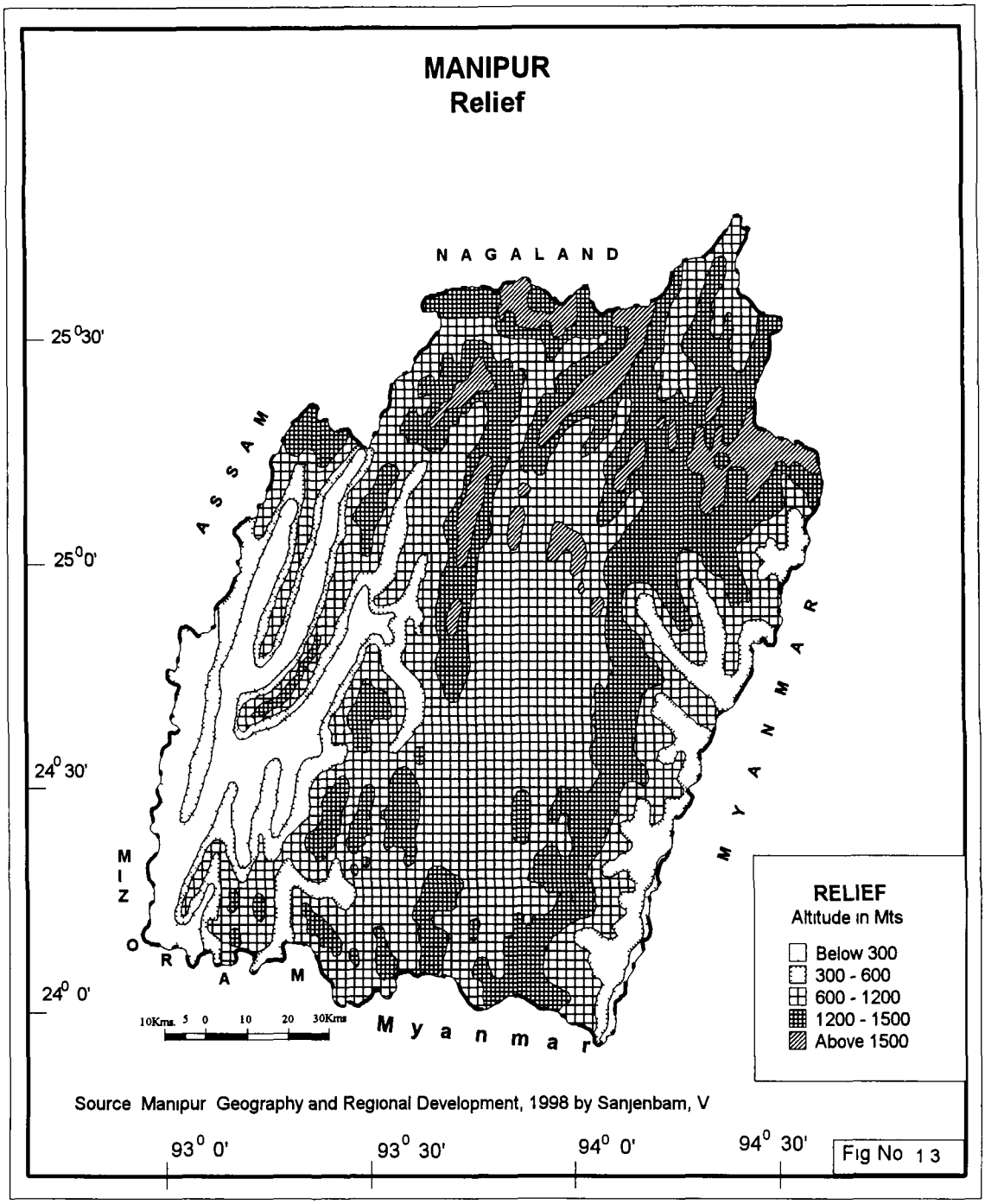
The Manipur eastern hills having the important hill ranges of *Nupithel (Mapithel), Chingai, Malain, Angoching and Yomadung* forms a compact and continuous chain along the Indo-Myanmar frontier for about 200 km., attains an average height of about 1,500 metres. The breadth ranges from 50 km. in the north to about 30 km. in the south. *Khayangbung* (2,833m.), *Shiroi* (2,568m.) and *Kachubung* (2,498m.) are the important peaks. Formed of the Disang shales, Ukhrul limestones and the serpentinites, the Manipur eastern hills contain a number of important minerals like limestone, chromite, talk, nickel and copper ores.

With the number of parallel ranges - *Uningthou, Koubru, Khoupum,* and *Haobi*, the Manipur western hills spreads over the entire western part, running north to south for about 180 km. with a breadth of 50 km. in the north and 70 km. in the south. The hills are generally higher in north and west and lower towards the south. Important peaks of this hill region are *Tenipu* (2,994m.), *Koubru* (2,652m.), *Leikot* (2,831m.), *Tamphaba* (2,664m.), and *Iso* (2,460m.). Small valleys are also found running parallel with ridges from north to south. These hills

are composed of compact sandstones, shales and clays of the Barail series, but their western slopes are covered with sandstones, shales, mudstones and conglomerates of the Surma series.

Like the Vale of Kashmir and Kathmandu Valley in the Himalayas, Manipur valley, enclosed by Manipur eastern and western hills, is also one of the Himalayan midlands. It is a large intermont basin, about 70 km. long and 35 km broad having an area of 2,067 sq. km. The valley is a high level flood plain with an elevation of about 760 metres above mean sea level. The 900 metres contour forms its outer limits. It is a lacustrine plain-site of an ancient lake, which was subsequently filled up and uplifted to its present position, the remnant of which occupies the south-east corner of the valley, the Loktak Lake (Singh, 1982). This basin of flat-land topography, formed by the alluvial deposits after the Tertiary period, is occassionally broken by hills and mounds which rise above the flat surface. This include the *Langol, Heingang, Nongmaijing Ching, Langthabal* and *Waithou* etc. The scenic beauty of Loktak Lake, which is the largest fresh water lake in north-east India, is moreover coloured with a series of islands which rise above the water level. *Sendra, Ithing, Thanga* and *Karang* are the most important among them.

Barak basin on the western flanks, beyond the Manipur western hills, is a small plain formed by the headward erosion and subsequent deposition of river Barak and its tributary Jiri. This basin is dotted with low sanstone hillocks, the Barak basin contains rocks of both

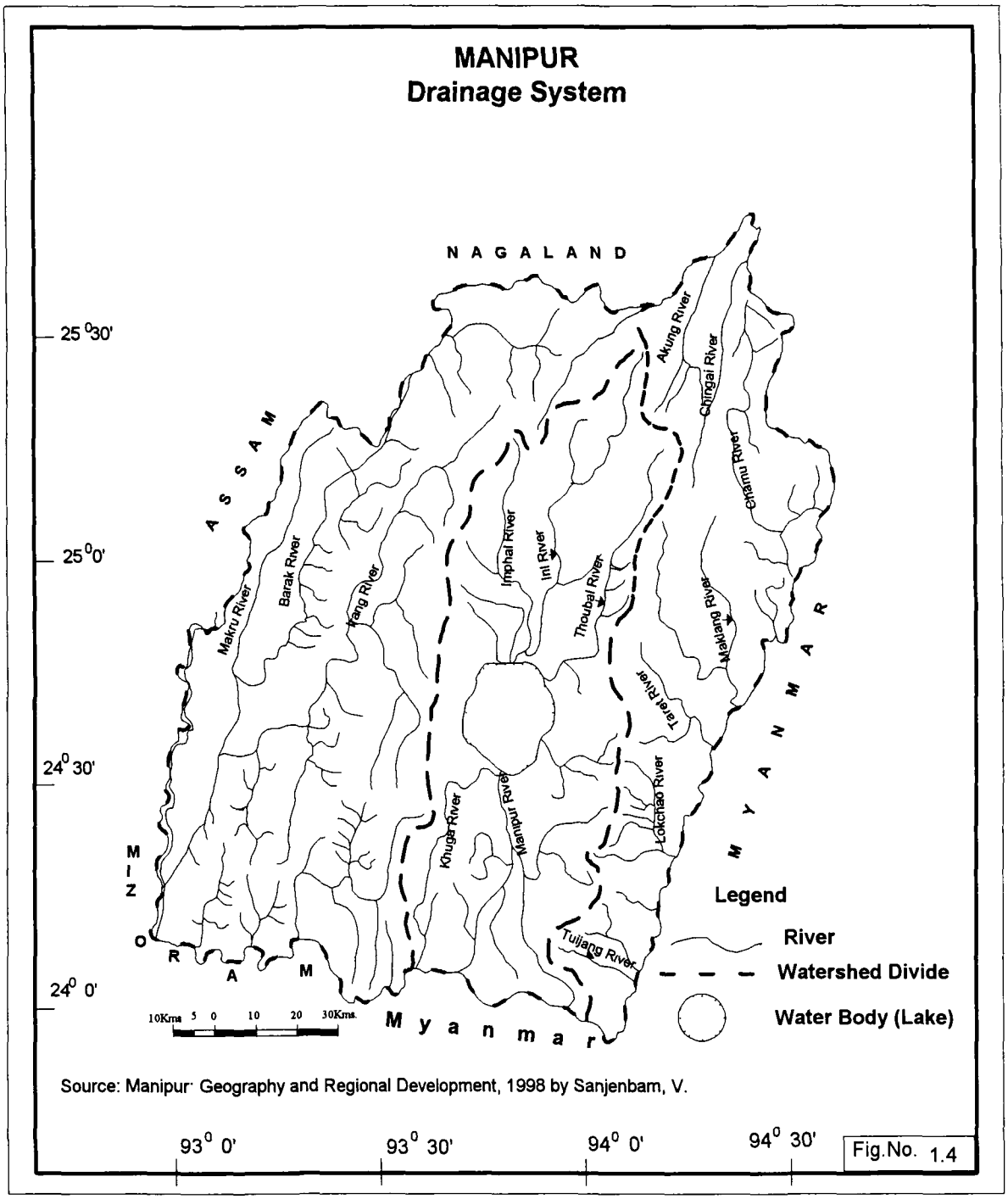

MANIPUR
Relief
NAGALAND
ASSAM
MIZORAM
MYANMAR
Myanmar
25°30'
25°0'
24°30'
24° 0'
93° 0'
93° 30'
94° 0'
94° 30'
10Kms. 5 0 10 20 30Kms
RELIEF
Altitude in Mts
Below 300
300 - 600
600 - 1200
1200 - 1500
Above 1500
Source Manipur Geography and Regional Development, 1998 by Sanjenbam, V
Fig No 13

Surma and Tipam series. Thus, altitudinal variations range from 95m. in the Barak basin to 2,994m. in the northern hill section of Manipur.

1.3: Drainage

The state is drained by various streams, which belong to three river systems (fig.1.4). Manipur river and its tributaries-Imphal, Iril, Thoubal, Nambul, Nambol, Khuga and Sekmai with Loktak Lake and other associated lakes form the water resources of the central valley. It has a catchment of 6,322 sq.kms. and embraces 28.4 percent area of the region. The Iril river is the largest on the Central plain and meets in the Imphal river at Lilong. The Thoubal river also meets with Imphal river at Irong. It merged with Loktak Lake and further flows down in the name of Manipur river. After crossing the Manipur border, it joins with Chindwin river of Myanmar and finally meets with Irrawady river to merge in the Bay of Bengal. These rivers carry a good amount of silt, which has raised their beds considerably. Discharging maximum quantity of water during the monsoon months, they frequently innundate the land along the river banks.

The Barak river is the main river in the western part of the state with a number of its tributaries, like the Jiri, the Makru, the Irang, the Tuivai and their associated streams, which drain in the northern and western hill areas, have a catchment of 9,042 sq.kms, covers about 40.5 percent area of the entire region. Its source lies close to the Nagaland - Manipur border.At one point it forms the trijunction between Mizoram, Manipur and Assam. The Barak enters the plains of



Source: Manipur· Geography and Regional Development, 1998 by Sanjenbam, V.

Fig.No. 1.4

the adjoining Cachar district of Assam as it bends north-westward and after crossing the low hills of the Bhubon range it flows into Assam.

The eastern slopes of the Manipur eastern hills are washed by a number of small streams of Chindwin system, which have a catchment of 6,953 sq.kms., about 31.1 percent area of the state. River Akonglok and its tributaries - Chamu and Chingai, and river Yu and its tributaries - Maklang, Tuyungbi, Taret Lok, Lokchao, Lailimlok and Tuiyang flowing in sub-parallel pattern through their steeply cut valleys, finally join the Chindwin river in Kabaw valley in Myanmar.

These swift flowing rivers and streams of the state, associated with waterfalls and springs in the hills, and lakes and marshes in the valley, have economic importance for agricultural and industrial growth of Manipur.

There are a number of lakes in Manipur valley besides swamps and marshes along the lakesides and in the inter-riverine tracts. *Loktak, Pumlenpat, Kharungpat, Ikoppat* and *Waithoupat* etc. are important lakes.

1.4: Climate

Manipur enjoys a typical monsoonal climate with variants ranging from tropical to temperate conditions. The rapid changes in topography results in climatic changes within short distances. The foothills, plains, sheltered valleys and the ranges are marked with climatic contrast. The Barak basin and the lower foothills of Manipur

western hills have a warmer climate than the central valley and the surrounding hills. Eastern foothills near Moreh bordering with Myanmar is also relatively warmer. The western part of the state has more rain than the easten part due to its location on the windward slope of the hills.

Cold weather can be experienced even in the month of February but in the month of January, which is the coldest, the temperature in Imphal is between 4^0 and 20^0 celsius. Sometimes the temperature goes down to below freezing point and there is fog and mist in the morning hours during winter. The summer season starts with sudden increase of temperature, vanishing fog and occasional thundershowers. The early part of this season is the pleasant 'spring' season, the period of major festivals and dances in the state. The rainy season is associated with heavy rainfall, widespread cloudiness, high humidity and invariably surface winds. The rains heralds the beginning of the agricultural activities. The retreating monsoon season is marked by the gradual decline in rains, clear sky, short duration morning fogs and fair and pleasant weather besides bright sunny days and cool pleasant nights.

Table 1.2: Average monthly distribution of temperature (°c) and rainfall (cm) in Manipur (1999)

Stations	Temp / Rainfall	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual	Range of temp
Imphal (Jiri)	Temp	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rainfall	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lamphel-pat	Temp	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rainfall	-	-	-	-	-	-	-	-	-	-	-	-	-	
IFCD-Lamphel	Temp	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rainfall	Nil	Nil	1 70	Nil	Nil	14 18	21 16	19 92	12 31	Nil	Nil	Nil	69 27	
Raj- Bhavan	Temp	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rainfall	0 03	0 00	Nil	Nil	Nil	8 15	17 90	18 85	12 08	Nil	Nil	Nil	57 01	

Thoubal-Wangbal	Temp	15 5	15 5	19 0	24 75	25 5	26 0	26 25	26 0	25 0	23 75	19 0	13 5	18 25	12 75
	Rainfall	0 46	Nil	4 82	1 04	15 11	10 97	22 59	23 38	15 52	8 58	0 84	2 06	105 37	
C C Pur-Tuibong	Temp	8 5	14 0	17 5	22 0	21 0	23 0	22 0	23 0	22 0	19 5	13 5	9 0	14 2	14 5
	Rainfall	1 50	Nil	5 60	5 30	41 0	29 50	35 24	41 82	43 80	26 17	2 60	2 60	235 13	
Tinsong	Temp	16 0	20 0	20 25	22 50	22 25	22 0	22 5	23 0	22 5	22 75	20 25	17 0	19 75	7 0
	Rainfall	2 0	Nil	5 50	6 22	55 16	34 48	70 29	36 25	50 27	3 01	5 18	8 20	276 56	
Thanlon	Temp	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rainfall	0 56	0 00	7 08	8 06	48 48	26 53	56 88	64 64	51 46	31 64	6 30	1 54	303 17	
Geljang	Temp	14 0	18 5	20 0	23 0	26 5	25 5	27 0	27 5	28 0	22 5	14 0	13 5	19 5	14 5
	Rainfall	1 40	0 80	2 00	2 80	11 40	7 10	9 40	7 80	10 80	6 50	Nil	Nil	60 00	
Chandel	Temp	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rainfall	-	-	-	-	-	-	-	-	-	-	-	-	-	
Senapati-Kangpokpi	Temp	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rainfall	Nil	Nil	5 51	3 00	46 51	27 70	33 72	65 01	33 91	26 62	Nil	Nil	241 98	
Saikul	Temp	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rainfall	Nil	Nil	2 51	1 90	45 40	31 30	26 60	49 41	17 50	24 80	Nil	Nil	199 42	
Tameng-Long	Temp	16 0	-	-	22 5	23 5	25 5	23 0	23 50	-	-	18 5	18 0	-	-
	Rainfall	0 12	-	-	3 60	25 60	41 05	45 10	28 80	-	-	0 10	0 30	-	
Ukhrul	Temp	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rainfall	Nil	Nil	3 65	20 34	14 12	18 00	49 18	20 31	12 30	-	-	-	-	

\- Not Available

Source: Statistical Abstract of Manipur, 2001,Directorate of Economics and Statistics, Govt. of Manipur.

Temperature and rainfall data are not available since the last three or four years in Manipur. Data of 1999 assessment is the latest one, in which number of recording centres were not working properly due to recording machines which were found unserviceable. Highest temperature i.e., 39°C was recorded in the month of May in Geljang in Churachandpur district while lowest temperature i.e., 0°C was also recorded at Geljang in December and January. In the valley, 34.5°C was recorded at Thoubal as highest temperature in April and 2°C as lowest temperature in December and January. Thus, April and May are the hottest months in Manipur while December and January are the coldest months.

Same problem is also with the rainfall figures. Numbers of centres have not been working properly and so the annual figures are not known. Highest annual rainfall of 303.17cm was recorded at Thanlon centre (Churachandpur district) while lowest rainfall of 57.01cm was at Raj Bhavan (Imphal) in 1999.Jiribam recording centre was also not working otherwise it would have given the highest rainfall figure for Manipur.

A year in Manipur can be broadly divided into four seasons. The summer season begins with early March and extends upto May, then the rainy season starts by mid-May upto September. October and November are the retreating monsoon months and the period from December to the end of February is the winter season. The winter and summer seasons are dry while rainy and retreating monsoon seasons are wet.

1.5: Soils

Manipur is endowed with rugged topography, narrow range of geology, climate and vegetation which governs the ecosystem and influences the development and behaviour of different kind of soils. It is revealed that the soils have been derived primarily from shales and sandstone. Climate and relief have played a dominant role in the development of these soils. Weathering is intense due to high precipitation under favourable condition of temperature and vegetation. The state comes under the warm per-humid agro-eco region. However, at micro level it can be divided into two distinct sub-eco regions with

thermic and hyperthermic temperature regimes. Thus, soils of Manipur are categorized broadly under two heads.

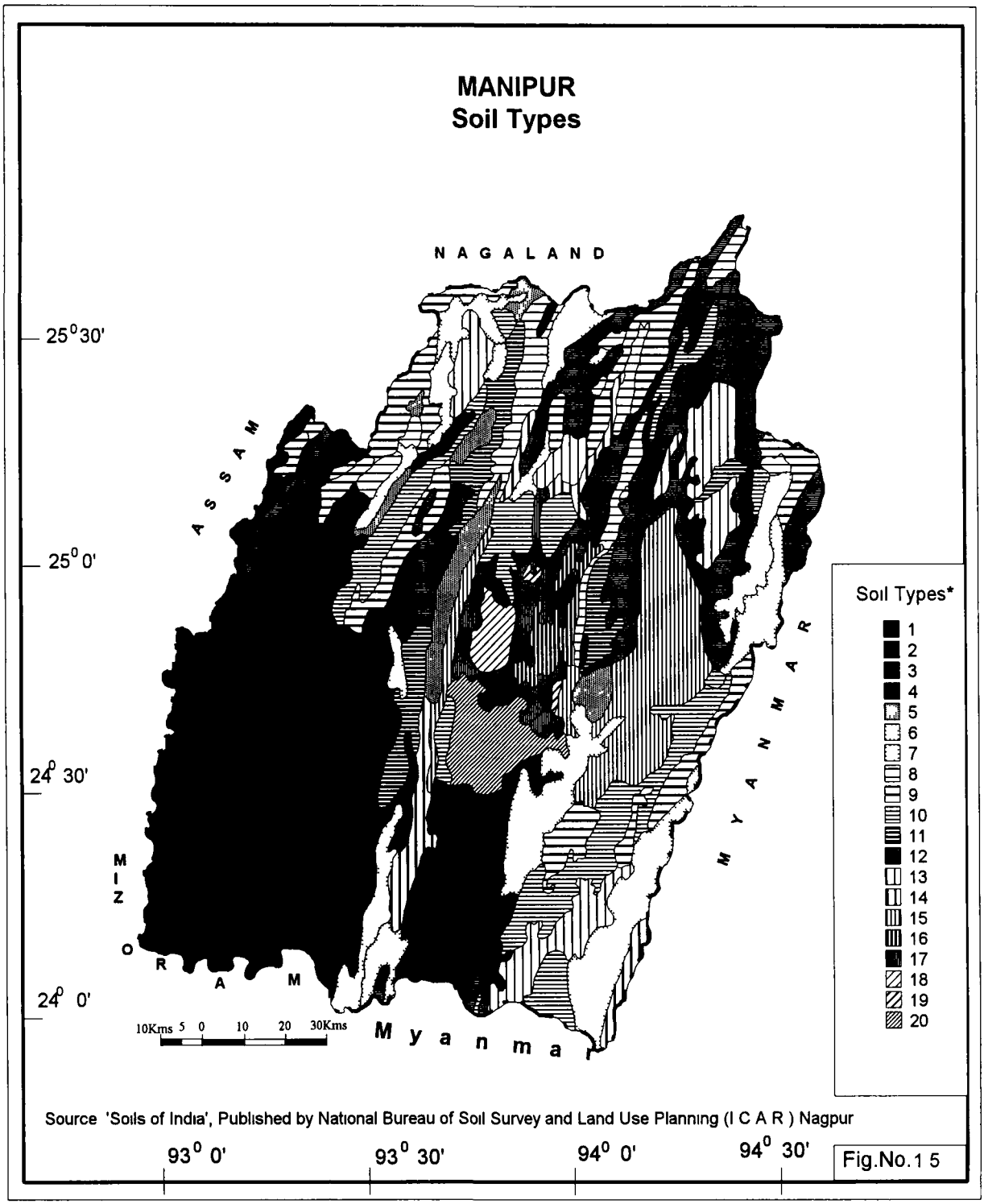
1. Soils of warm per-humid agro-eco zone with thermic eco-system:

This kind of soils are derived from shale and sandstone and they occur mostly on the hills of varying slopes. Soils occurring on the gently sloping foot-hills are generally deep but vulnerable to sheet and rill erosion hazard. These are well drained soils having greyish brown to yellowish brown colour. They are well developed in some places and qualify for Inceptisols, Alfisols and Ultisols. These comprise of Umbric Dystrochrepts, Typic Haplohumults and Ultic Hapludalfs.

Soils of the steep to very steep hill slopes are very much susceptible to erosion. The texture varies from clayey skeletal to fine and are classified as Typic Kanhapludults, Umbric Dystrochrepts, Typic Udorthents, Typic Haplohumults and Typic Hapludults.These soils are acidic ranging from moderately acidic to slightly acidic with high organic matter content. These soils are highly leached and devoid of bases. The base saturation varies between 14 to 30 percent.

2. Soils of warm per-humid agro-eco zone with hyperthermic eco-system:

Soils of this region are heterogenous in nature and developed on gently sloping narrow valleys and strongly sloping to moderately steep side slopes of hills with moderate to severe erosion hazards. These are well to excessively drained. The texture varies from fine to loamy



*Note Soil types are denoted by different numbers according to their category given in table no 1 3

skeletal and classified as Umbric Dystrochrepts, Typic Dystrochrepts and Typic Haplohumults.These soils are moderately to strongly acidic, humus rich and have low base saturation status. Soils developed in narrow valley are deep, poorly drained, fine in texture with slightly erosion hazard (fig.1.6).

Table 1.3: Soils of Manipur

Sl.No.	Taxonomic Name of Soil	Area ('000 hectare)	Percentage to the total area
1.	Fine-loamy, Umbric Dystrochrepts	29.2	1.30
	Fine, Typic Haplaquepts		
2.	Fine, Typic Dystrochrepts	331.4	14.81
	Fine, Typic Haplohumults		
3.	Cleyey-skeletal, Typic Haplohumults	150.3	6.72
	Loamy-skeletal, Umbric Dystrochrepts		
4.	Fine-silty,Umbric Dystrochrepts	97.8	4.37
	Fine, Typic Haplohumults		
5.	Fine, Umbric Dystrochrepts	93.2	4.16
	Fine, Typic Haplohumults		
6.	Fine, Typic Kanhapludults	118.1	5.28
	Fine, Ultic Haplududalfs		
7.	Fine, Typic Haplohumults	106.0	4.75
	Fine-loamy, Umbric Dystrochrepts		
8.	Fine, Typic Hapludults	86.0	3.84
	Fine, Typic Haplumbrepts		
9.	Fine-loamy, Typic Dystrochrepts	178.0	7.95
	Cleyey-skeletal,Typic Baplohumults		
10.	Fine, Typic Paleudults	197.0	8.80
	Cleyey-skeletal, Typic Udorthents		
11.	Fine, Typic Palehumults	101.6	4.54
	Cleyey-skeletal, Typic Udorthents		

12	Cleyey-skeletal, Typic Udorthents Fine-loamy, Typic Hapludults	307 0	13 72
13	Fine-silty,Typic Udorthents Cleyey-skeletal, Fluventic Umbric Dystrochrepts	184 1	8 23
14	Fine-silty,Typic Haplaquepts Fine, Aquic Dystrochrepts	55 8	2 49
15	Fine, Typic Haplaquepts Fine, Reptic Ultic Dystrochrepts	23 1	1 03
16	Fine,Typic Humaquepts Cleyey-skeletal, Umbric Dystrochrepts	10 9	0 48
17	Very fine, Mollic Haploquepts Fine, Typic Haplaquepts	100 6	4 49
18	Very fine, Mollic Haplaquepts Fine, Fluvaquentic humaquepts	15 7	0 70
19	Fine, Typic Hapludalfs Fine-silty, Typic Haplumbrepts	3 9	0 17
20	Marshy land	43 0	1 92

Source: 'Soils of Manipur' (1987) National bureau of Soil survey and Landuse planning (ICAR), Regional centre, Jorhat.

1.6: Natural vegetation

The natural vegetation of Manipur mainly consists of forests, which occupies about 70 percent of the total geographical area. The forest area of the state can be divided into four zones viz., Myanmar border forests along the Indo-Myanmar border occupying an area of about 900 sq.kms., Ukhrul pine forest covering an area of about 1,300 sq.kms. of which good pine forest occupy about 30 sq.kms., forest overlooking the valley and Jiri-Barak drainage forest occupying a total

area of about 5,852sq.kms., of which about 1,300 sq.kms. are covered by tree forest while about 2,500 sq.kms. are covered by bamboo.

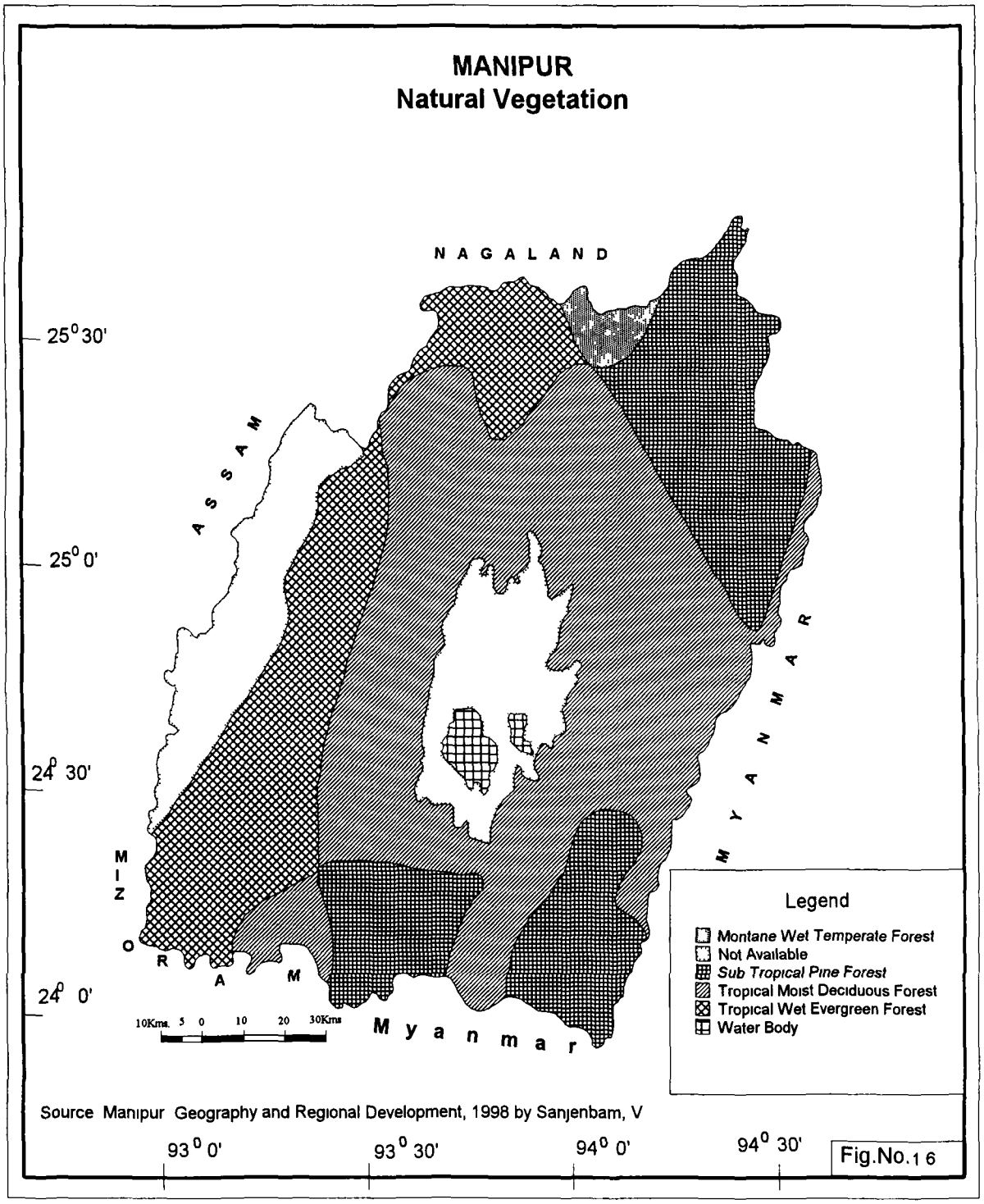
Medium to thick tropical deciduous and evergreen forests occupies the hills of Manipur in general. The ground is covered with thick undergrowth of bushes, shrubs, tall grasses and other types of vegetation. The variation of vegetation is marked by growth of specific species at particular altitude. Bamboo forests are common which exhibit a luxuriant growth in lower and gentle hill slopes.

The forest of this state can be grouped into four types viz., (i) tropical wet evergreen, (ii) tropical moist deciduous (iii) sub-tropical pine forest and (iv) montane wet temperate forest (Fig.1.6).

Tropical wet evergreen forests are usually found in the north and south-western parts of Manipur The annual rainfall here is 2,500mm. Here luxuriant evergreen forests are found. The main species of trees are bamboo and cane. These forests also contain timber species like *Haldi, Siris, Chaplash, Aini, Agar, Toon, Jarul, Bonsum* and Mango.

Tropical moist deciduous forests are found in the hilly areas of Senapati, Tamenglong, Churachandpur, Ukhrul and along the Indo-Myanmar border. The warm climate and moderate rainfall prevailing in this region is helpful for the growth of valuable teak trees. Oak, *Kangin, Khen* and *Toon* are also important timber species of this forest.

Sub-tropical pine forests are found in north-eastern part of Ukhrul, south-eastern part of Chandel and some portion of


MANIPUR
Natural Vegetation
NAGALAND
ASSAM
MIZORAM
MYANMAR
Myanmar
25° 30'
25° 0'
24° 30'
24° 0'
93° 0'
93° 30'
94° 0'
94° 30'
10Kms. 5 0 10 20 30Kms
Legend
Montane Wet Temperate Forest
Not Available
Sub Tropical Pine Forest
Tropical Moist Deciduous Forest
Tropical Wet Evergreen Forest
Water Body
Source Manipur Geography and Regional Development, 1998 by Sanjenbam, V
Fig.No.16

Churachandpur districts. Pine trees, particularly the Khasi pine with important species of orchids including Shirui Lily are found in the area along with oak and chestnut trees.

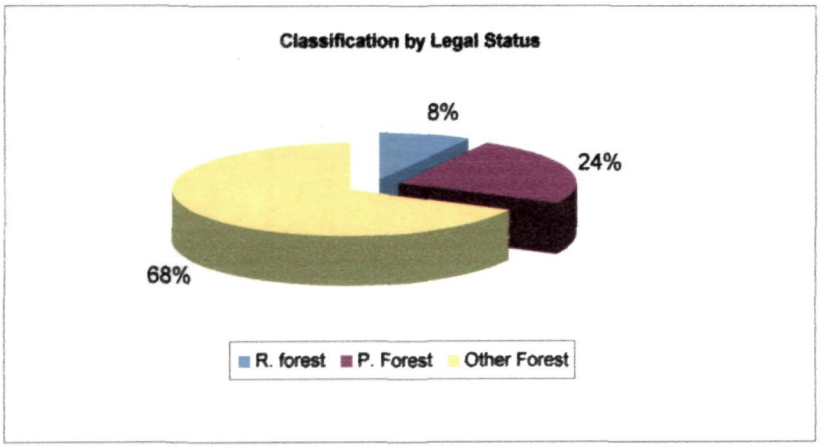
Montane wet temperate forest cover the northernmost part of Senapati district, where oak trees are grown very widely.

Table 1.4: Classification of forest, Manipur (1997-98)

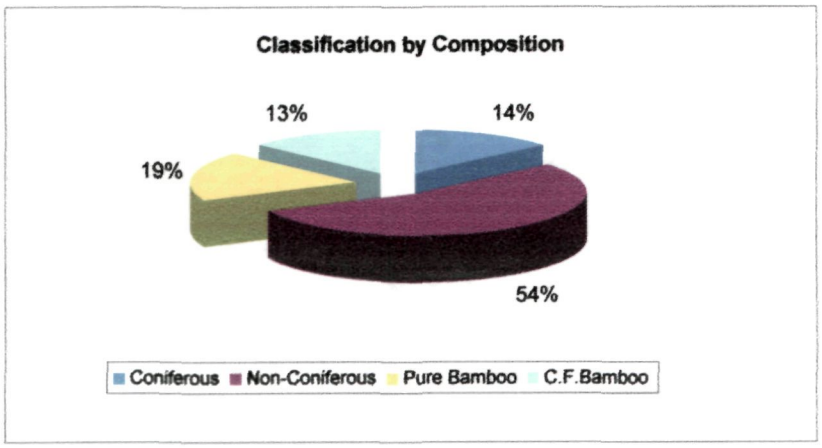
Classification by	Area (sq.kms.)	Percentage to the total forest area
A.Legal status:		
Reserved forest	1,467	8.4
Protected forest	4,171	24.0
Other forest	11,780	67.6
Total	17,418	100.0
B. Composition:		
Coniferous	2,442	14.02
Non-Coniferous (broad leaved)	9,442	54.22
Pure bamboo brake	3,268	18.76
Under storey and clump forming bamboo	2,264	13.00
Total	17,418	100.00
C. Types (Broadly)(FSI- 1995)		
Wet Temperate forests	1,451	8.23
Pine forests	2,443	13.86
Wet hill forests	9,057	51.40
Semi-evergreen forests	645	3.66
Teak Gurjan forests	611	3.47
Bamboo brakes	3,268	18.55
Grassy blanks	146	0.83
Total	17,621	100.00

Source: Statistical Bulletin, 1997-98, Forest Department, Government of Manipur.

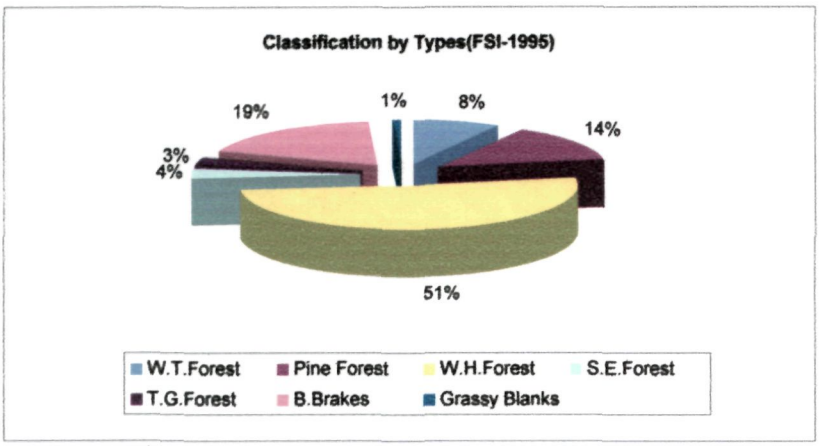
MANIPUR: CLASSIFICATION OF FORESTS (1997-98)



(a)



(b)



(c)

Fig. No. 1.7

Source: Staistical Bulletin, 1997-98, Forest Department, Govt. of Manipur.

CHAPTER - II

SOCIO-ECONOMIC SETTING OF MANIPUR

Manipur is gifted with rich natural resources. The lush-green forests in the hills, fertile alluvial soils in the river basins, swift-flowing rivers and streams, a large number of fresh water lakes including the Loktak, and an optimum climate which is affecting the socio-economic growth of Manipur. The fertile river valleys are well suited for agriculture and horticulture, the water bodies and marshes for fisheries and poultry, the foothills for livestock and dairying and the hill areas with rich forests and minerals for the development of the industries. The natural scenic beauty and the cultural beauty are well suited for the development of tourism.

The state has a great potential for fruit cultivation and some production is already being realised but much more can be done. There is need to lay more emphasis on better farming and on raising the output so that the lives of people could be improved and the state's income increased. The state has already acquired sufficient trained manpower to implement schemes for improvement of agriculture. The production of rice, by utilising high yielding varieties, has gone up and is of the order of 2,834 kg. per hectare and there is now higher consumption of fertilizers.

Major and minor irrigation projects have been implemented over the Five Year Plans and nearly 60,000 hectares of cultivated land has been brought under irrigation provided under the various schemes. The Loktak, the largest fresh water lake in north-east India and state's source of irrigation and hydro-electricity, has benefited the state

through the implementation of the projects based on it. With its vast water resources, Manipur offers much scope for both irrigation and hydro-electric power generation.

In this chapter an attempt is made to assess the socio-economic setting of Manipur. This chapter is mainly based on secondary source of data.

2.1: Population

According to 2001 Census, Manipur has a population of 2,388,634, of which 1,207,338 are males and 1,181,296 are females. The density of population is 107 persons per sq.km. About 1,818,224 persons live in rural areas and 570,410 live in urban areas (Census of India, 2001). If we compare these figures with 1991 figures, it was observed that the population has increased 1.3 times and the density has also increased 1.3 times.

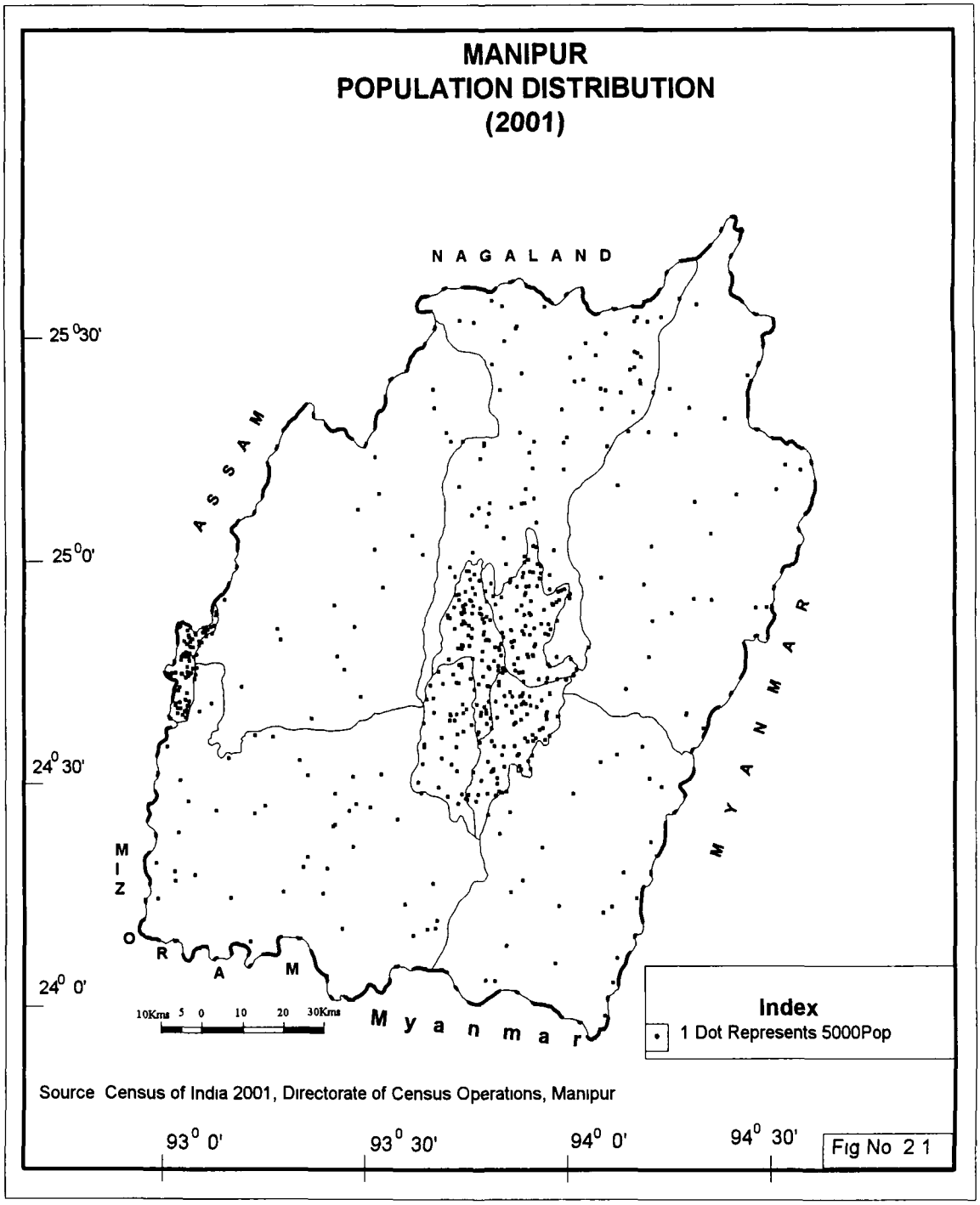
Four districts of the Central Valley, Imphal East, Imphal West, Thoubal and Bishnupur have large concentration of population, while the hill districts of Senapati, Tamenglong, Churachandpur, Chandel and Ukhrul have sparse and scattered population (fig. 2.1). In Central Valley of Manipur, which covers about 10.03 per cent (including Jiri region) of the state area, live about 58.84 per cent of population while the surrounding hills, which covers 89.97 per cent of the state's land area, reside 41.16 per cent of the state's total population (Table 2.1).

The distribution of population in the state is closely linked with the character of terrain, climate variations and the pattern of landuse. The hill areas, which is characterized by rugged topography, high altitude, low transport and communication facility and extreme climate, have poor economic growth and consequently a low density of population. While the valley, which is characterized by flat, fertile, availability of amenities and facilities and moderate climate has better economic growth and thus high density of population.

Table 2.1: Area and Population of Manipur (2001 provisional)

Districts	Sl. No.	Name	Area (Sq.kms.)	Population	Density per sq.km.	Rank	Growth rate (1991-2001)
Valley districts	1.	Imphal East	670 (3.00)	393,780 (16.49)	555	3	19.16
	2.	Imphal West	558 (2.50)	439,532 (18.40)	847	1	15.42
	3.	Thoubal	514 (2.30)	366,341 (15.34)	713	2	24.62
	4.	Bishnupur	496 (2.22)	205,907 (8.62)	415	4	13.90
Hill districts	5.	Senapati	3,271 (14.65)	379,214 (15.88)	116	5	81.96
	6.	Tamenglong	4,391 (19.67)	111,493 (4.67)	25	9	29.23
	7.	Churachandpur	4,570 (20.47)	228,707 (9.57)	50	6	29.81
	8.	Chandel	3,313 (14.84)	122,714 (5.14)	37	7	72.80
	9.	Ukhrul	4,544 (20.35)	140,946 (5.90)	31	8	28.98
Total valley districts			2,238 (10.03)	1,405,560 (58.84)	628	-	18.51
Total hill districts			20,089 (89.97)	983,074 (41.16)	49	-	50.97
Total Manipur			22,327 (100.00)	2,388,634 (100.00)	107	-	30.02

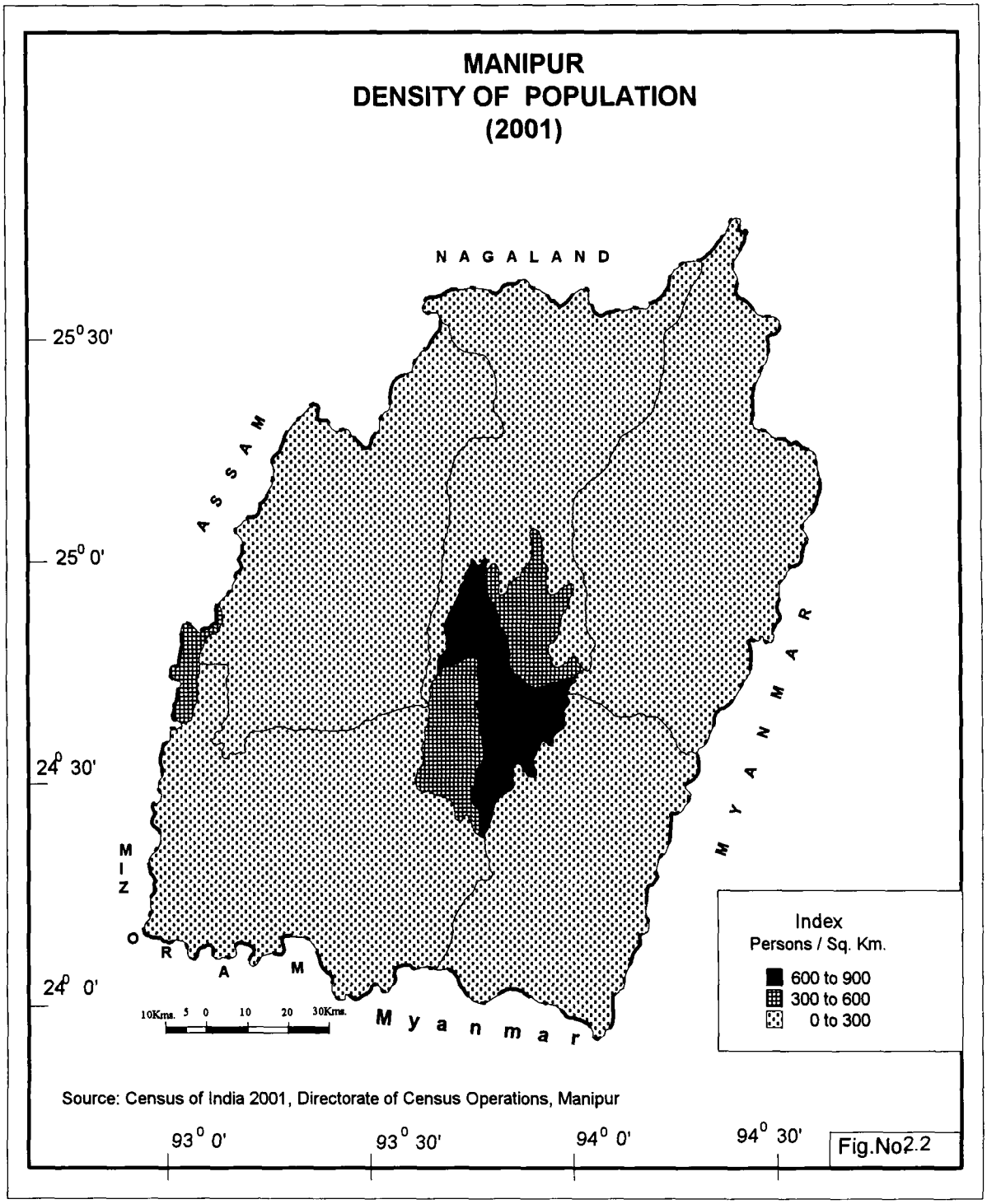
Note: Figures in brackets represent percentages to the total.
Source: Census of India (2001), Directorate of Census Operations, Manipur

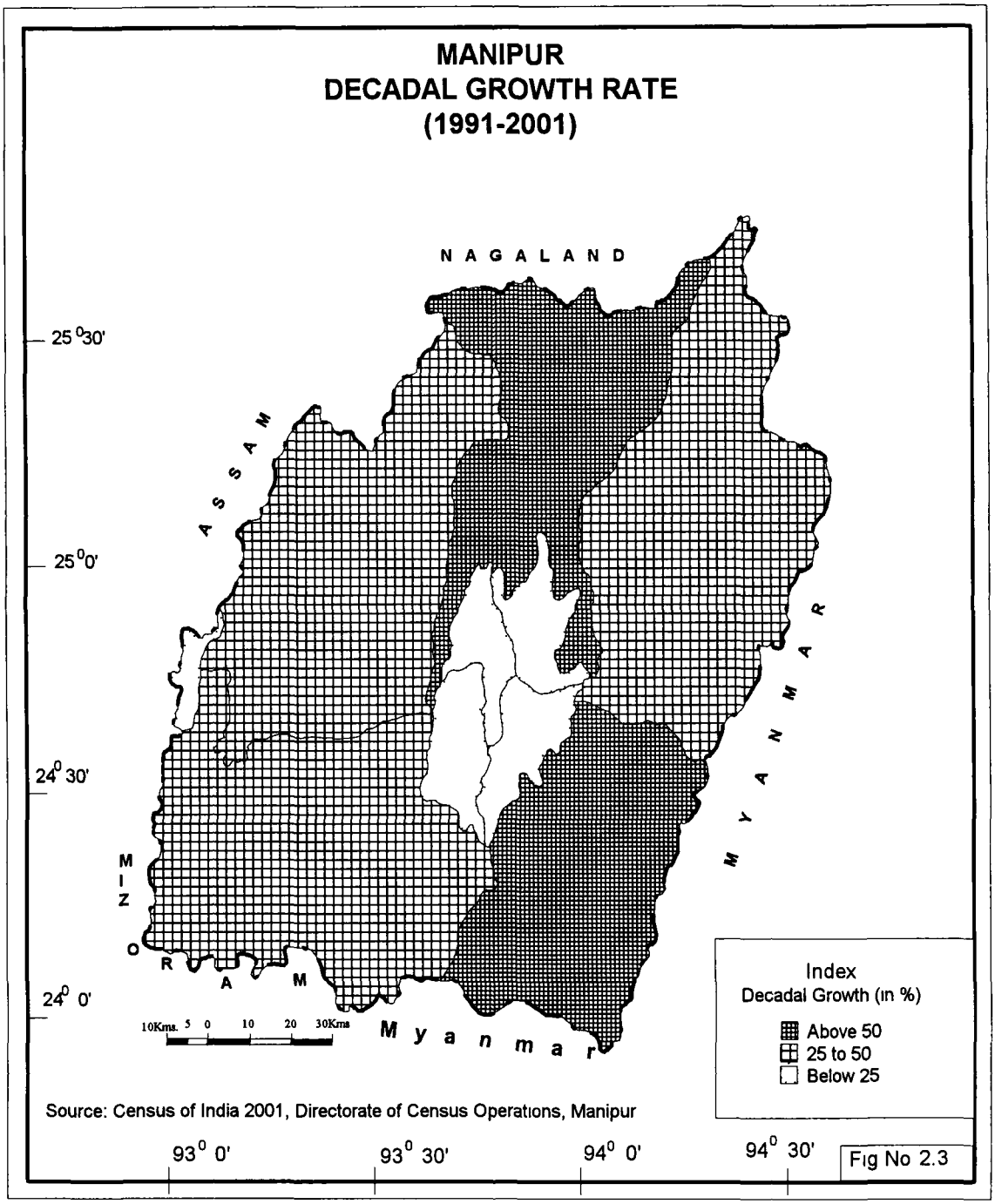

MANIPUR
POPULATION DISTRIBUTION
(2001)
NAGALAND
ASSAM
MYANMAR
MIZORAM
Myanmar
25°30'
25°0'
24°30'
24° 0'
10Kms 5 0 10 20 30Kms
Index
1 Dot Represents 5000Pop
Source Census of India 2001, Directorate of Census Operations, Manipur
93° 0'
93° 30'
94° 0'
94° 30'
Fig No 2 1

Among the valley districts, highest density of population was recorded in Imphal West with 847 persons per sq. km. The district also recorded highest density in 1991 with 685 persons per sq. km. Thoubal district has 713 persons per sq.km., and has the second highest density in 2001, followed by Imphal East with 555 persons and Bishnupur with 415 persons per sq. km. Among the hill districts, Senapati district has highest density of population with 116 persons per sq. km. This is the only district among the hill districts which has crossed the population density of 100 persons per sq. km. Remaining hill districts have very low density of population with 50 persons in Churachandpur, 37 persons in Chandel, 31 persons in Ukhrul and 25 persons in Tamenglong districts (fig.2.2).

The decadal growth rate of the state during 1999-2001 was 30.02 per cent as against 21.34 per cent of the entire country. The hill districts recorded higher decadal growth rate with exceptional high growth rate i.e., 81.96 per cent in Senapati district and 72.80 per cent in Chandel district. Ukhrul district has the lowest decadal growth rate with 28.98 per cent among hill districts. Tamenglong and Churachandpur districts have slightly more than 29 per cent growth rate (Fig.2.3).

In valley districts, the decadal growth rates are low. Thoubal district has a decadal growth rate of 24.62 per cent and accommodates 15.34 per cent of the total population of the state. Imphal district, which has 19.16 growth rate, has about 16.49 per cent of the total population of the state. Imphal West having about 2.50 per cent area of the state, has 18.40 per cent of state's population .It has a decadal growth of 15.42 per


MANIPUR
DENSITY OF POPULATION
(2001)
NAGALAND
25° 30'
25° 0'
24° 30'
24° 0'
ASSAM
MIZORAM
MYANMAR
Myanmar
10Kms. 5 0 10 20 30Kms.
Index
Persons / Sq. Km.
600 to 900
300 to 600
0 to 300
Source: Census of India 2001, Directorate of Census Operations, Manipur
93° 0'
93° 30'
94° 0'
94° 30'
Fig.No2.2


MANIPUR
DECADAL GROWTH RATE
(1991-2001)
NAGALAND
ASSAM
MIZORAM
MYANMAR
Myanmar
25°30'
25°0'
24°30'
24°0'
93°0'
93°30'
94°0'
94°30'
10Kms. 5 0 10 20 30Kms
Index
Decadal Growth (in %)
Above 50
25 to 50
Below 25
Source: Census of India 2001, Directorate of Census Operations, Manipur
Fig No 2.3

cent. Bishnupur district has only 2.22 per cent of land area of the state and 8.62 per cent of state's population. It has only 13.90 per cent decadal growth rate. According to 2001 Census Provisional Report, 570,410 persons which is about 23.88 per cent of the total population live in urban area while remaining 1,818,224 which is about 76.12 per cent of the total live in rural areas of Manipur.

2.2: Social Composition

The state of Manipur is composed of many societies having different dialect, culture and life style. Scheduled castes and Scheduled tribes are the known weaker sections who have their own role in state's scenario. Data on social composition, according to 2001 Census, is not available and 1991 Census figures are used in this part of the chapter. According to 1991 census, Scheduled caste population in the valley districts ranges from 3.98 per cent in Imphal East, 3.76 per cent in Thoubal district, 2.52 per cent in Imphal West and 1.29 per cent in Bishnupur district, while in the hill district, they form microscopic minority ranging between 0.04 per cent in Tamenglong district to 0.33 in Chandel district (table 2.2, fig.2.4).

Table 2.2: Social composition of Population in Manipur

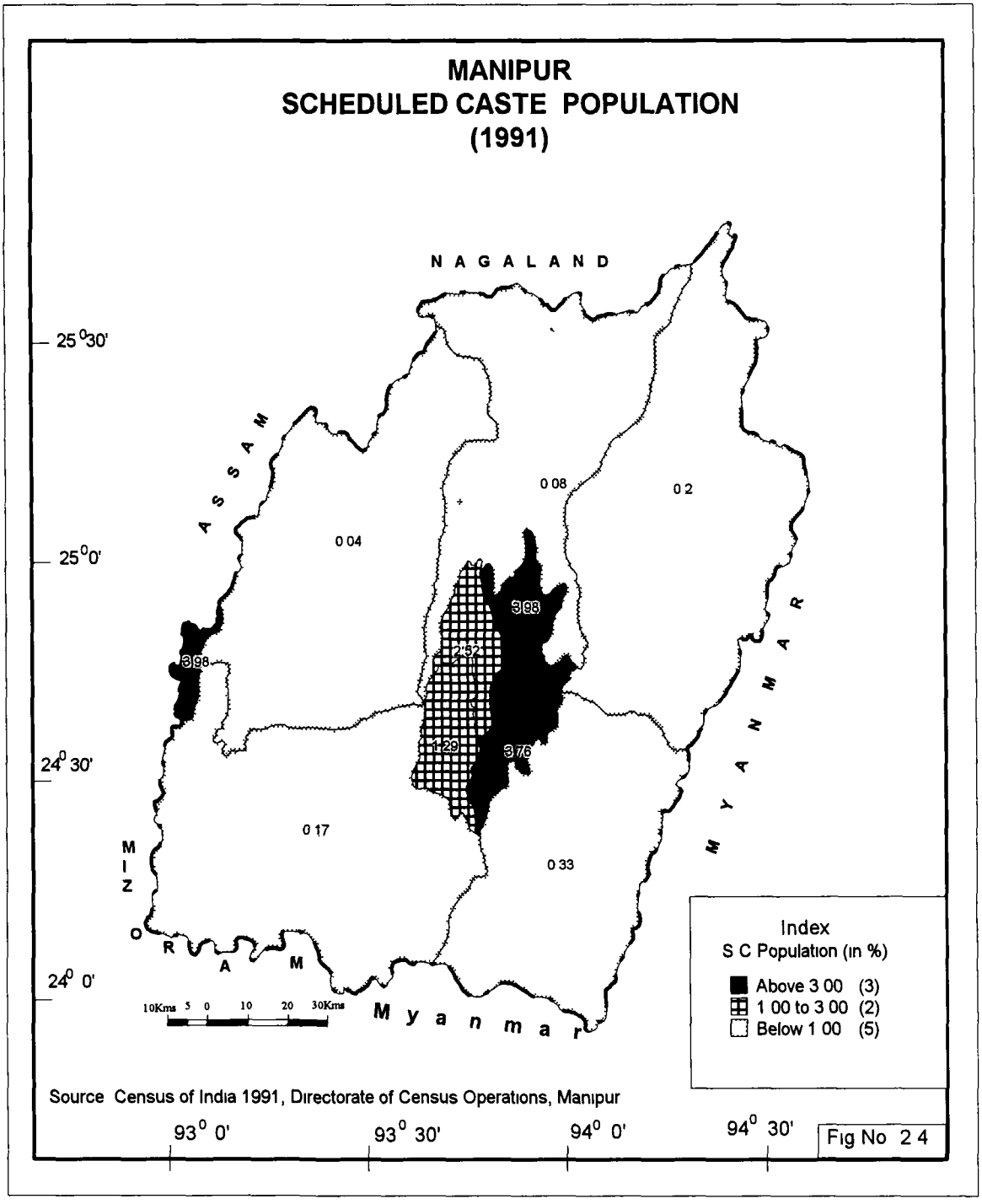
Districts	Sl. No.	Name	Sex ratio*	Literacy rate(in percentage)*	Schedule caste** (in %age)	Scheduled tribe ** (in %age)
Valley districts	1.	Imphal East	992	76.38	3.98	5.81
	2.	Imphal West	1,007	80.61	2.52	3.86
	3.	Thoubal	998	67.90	3.76	0.97
	4.	Bishnupur	1,004	71.59	1.29	5.30

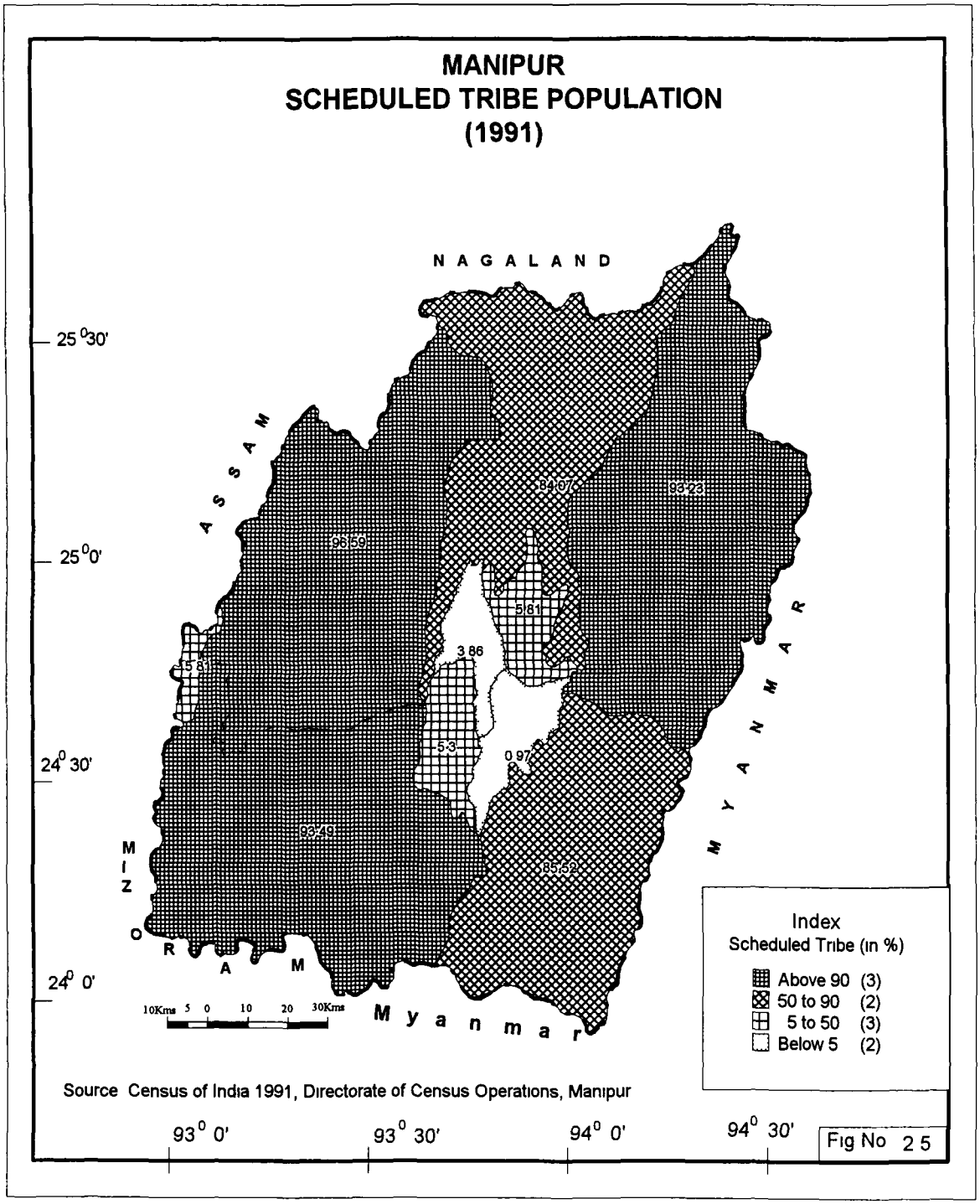
Hill districts	5.	Senapati	928	50.47	0.08	84.07
	6.	Tamenglong	922	58.46	0.04	96.59
	7.	Churachandpur	993	74.67	0.17	93.49
	8.	Chandel	986	57.38	0.33	85.52
	9.	Ukhrul	920	68.96	0.20	93.23
Total Valley districts			1000.03	74.79	3.04	3.91
Total Hill districts			948	60.51	0.15	89.97
Total Manipur			978	68.87	2.02	34.41

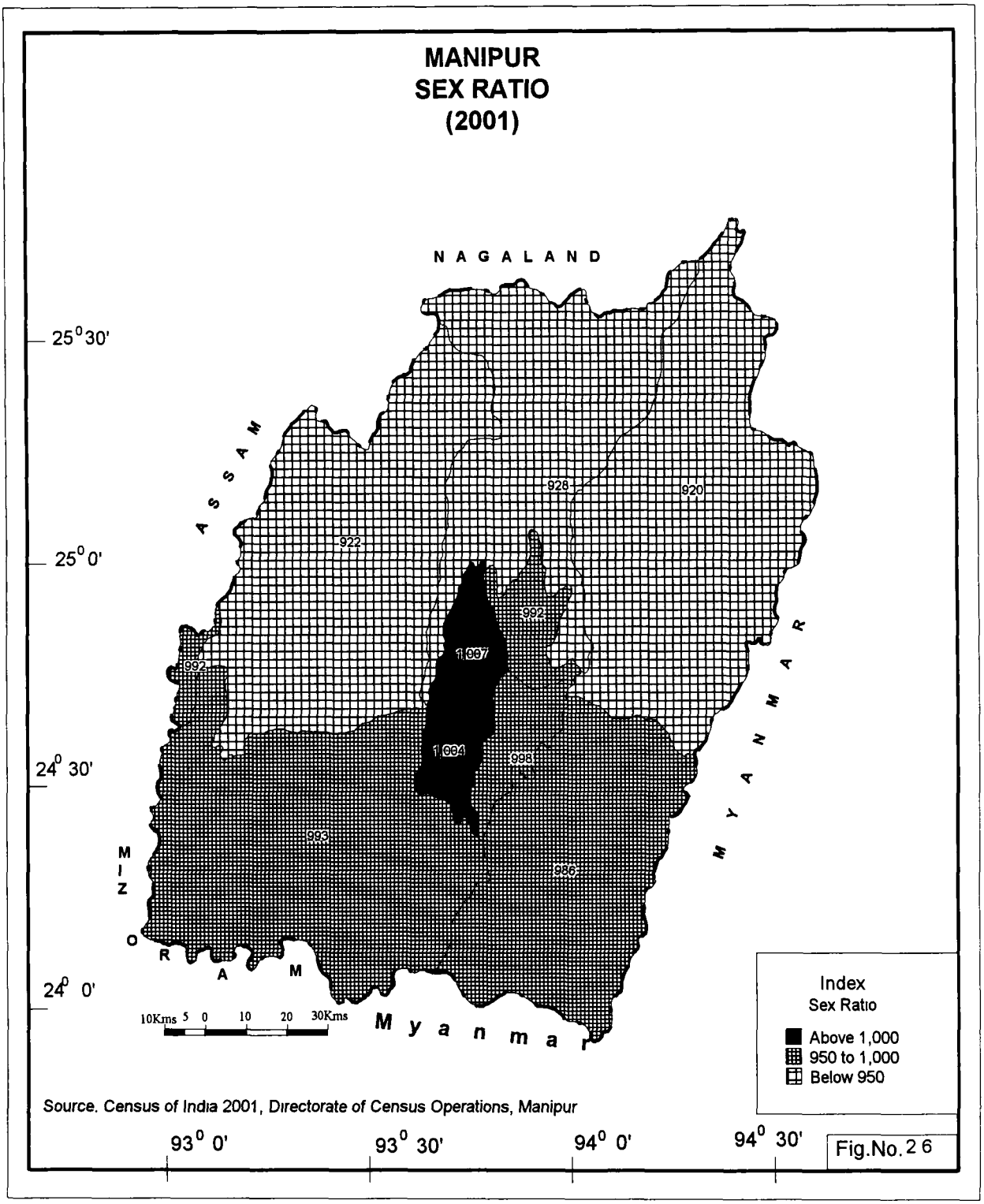
Note: * According to 2001 Census Provisional report
** According to 1991 Census Report.
Source: Census of India, 1991 & 2001, Directorate of Census Operations, Manipur.

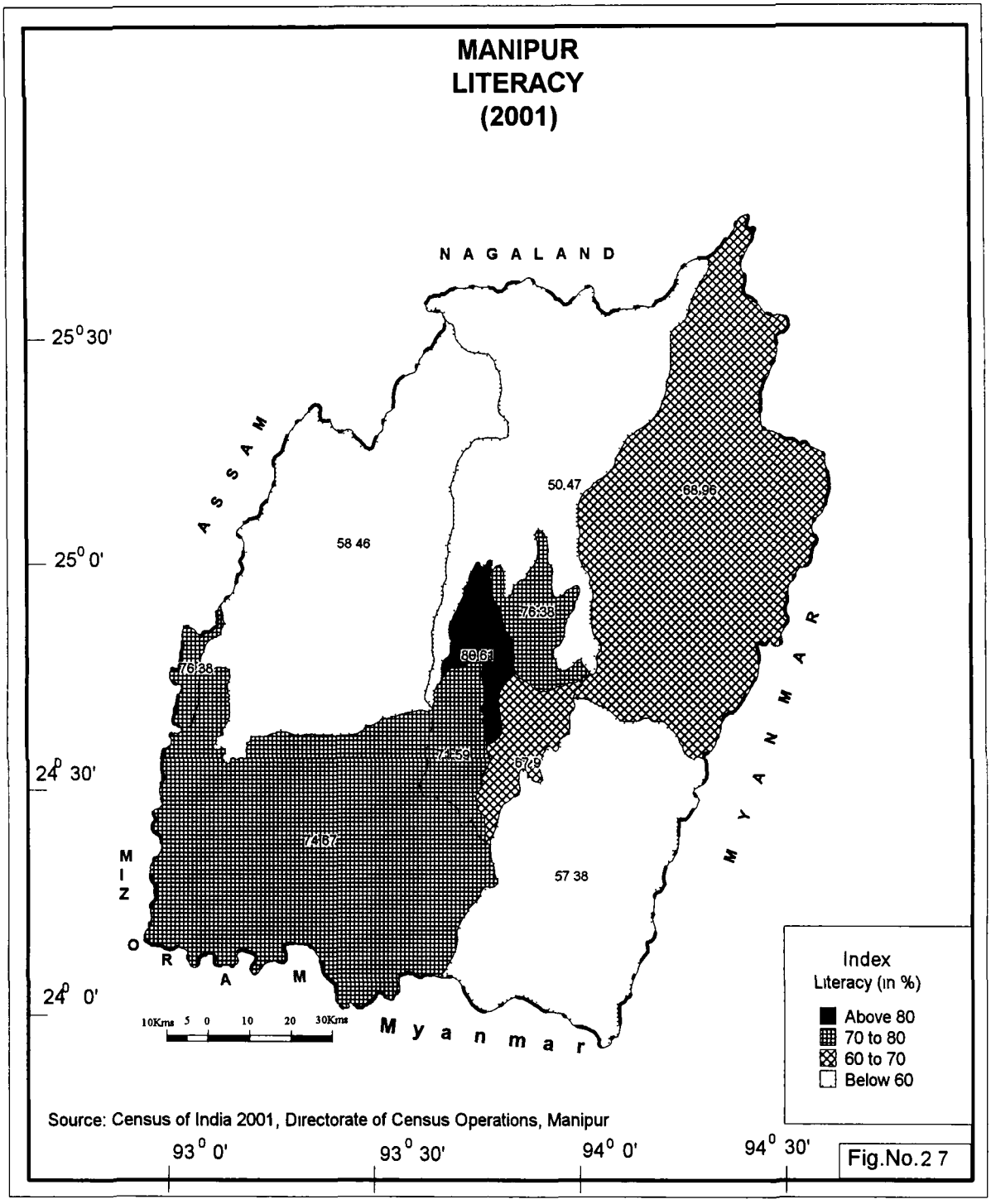
A perusal of table 2.2 shows that the Scheduled tribes comprising of Naga and Kuki groups, form 34.41 per cent of the total state population. In valley districts, their percentages are low with only 5.81 in Imphal East district, 5.30 per cent in Bishnupur, 3.86 per cent in Imphal West district and 0.97 per cent in Thoubal district (fig.2.5). But in the hill districts, the percentage of tribal population to the total population is relatively very high with 96.59 per cent in Tamenglong district, 93.49 per cent in Churachandpur district, 93.23 per cent in Ukhrul district, 85.52 per cent in Chandel district and 84.07 per cent in Senapati district.

The sex ratio figure shows that females per thousand males in Manipur is higher in the valley and lower in the hill districts. In Imphal West, the sex ratio is 1,007 while in Bishnupur, it is 1,004. Another two districts of the valley have also high female population with 998 females per 1,000 males (slightly less than male) in Thoubal district and 992 females per 1,000 males in Imphal East. In the hill districts,


MANIPUR
SCHEDULED CASTE POPULATION
(1991)
NAGALAND
ASSAM
MIZORAM
MYANMAR
Myanmar
25°30'
25°0'
24°30'
24°0'
93°0'
93°30'
94°0'
94°30'
0 04
0 08
0 2
0 17
0 33
3 98
3 98
2 52
1 29
3 76
10Kms 5 0 10 20 30Kms
Index
S C Population (in %)
Above 3 00 (3)
1 00 to 3 00 (2)
Below 1 00 (5)
Source Census of India 1991, Directorate of Census Operations, Manipur
Fig No 2 4


MANIPUR
SCHEDULED TRIBE POPULATION
(1991)
NAGALAND
ASSAM
MYANMAR
MIZORAM
Myanmar
25°30'
25°0'
24°30'
24°0'
93°0'
93°30'
94°0'
94°30'
94.07
93.23
98.59
5.81
3.86
5.81
5.3
0.97
93.49
85.32
10Kms 5 0 10 20 30Kms
Index
Scheduled Tribe (in %)
Above 90 (3)
50 to 90 (2)
5 to 50 (3)
Below 5 (2)
Source Census of India 1991, Directorate of Census Operations, Manipur
Fig No 2 5


MANIPUR
SEX RATIO
(2001)
NAGALAND
ASSAM
MIZORAM
MYANMAR
Myanmar
25°30'
25°0'
24° 30'
24° 0'
93° 0'
93° 30'
94° 0'
94° 30'
928
920
922
992
1,007
992
1,004
998
993
986
10Kms 5 0 10 20 30Kms
Index
Sex Ratio
Above 1,000
950 to 1,000
Below 950
Source. Census of India 2001, Directorate of Census Operations, Manipur
Fig.No. 2 6


MANIPUR
LITERACY
(2001)
NAGALAND
ASSAM
MIZORAM
MYANMAR
Myanmar
25°30'
25° 0'
24° 30'
24° 0'
93° 0'
93° 30'
94° 0'
94° 30'
50.47
68.96
58 46
76.38
80.64
76.38
74.59
67.9
74.67
57 38
10Kms 5 0 10 20 30Kms
Index
Literacy (in %)
Above 80
70 to 80
60 to 70
Below 60
Source: Census of India 2001, Directorate of Census Operations, Manipur
Fig.No.2 7

sex ratio ranges from 922 in Ukhrul district to 993 in Churachandpur district (fig.2.6).

The average literacy rate of Manipur is higher than the country's average literacy rate. According to 2001 Census, 68.87 per cent of the state's population are literate while the all India figure is only 65.37 per cent. Highest literacy rate is recorded at Imphal West district with 80.61 per cent while Senapati district has the lowest of 50.47 per cent (fig.2.7).

In Manipur 57.67 per cent are Hindus, 34.11 per cent are Christians, 7.27 per cent are Muslims and other small percentage of theist and atheist population (1991). Hindus, Muslims and other religious groups are mainly settled in valley while the hill districts have a high concentration of Christian population.

2.3: Tribal Population

The tribes of Manipur may be broadly divided into two groups, (a) *Naga* tribes and (b) Non- *Naga* tribes (belonging to *Kuki-Chin* group).

Naga groups have following tribes - the *Tangkhul*, the *Raungmei (Kabui)*, the *Mao*, the *Kaccha Naga (Liangmei)*, the *Lamgang*, the *Maring*, the *Anal*, the *Monsang*, the *Moyan*, the *Zemi*, the *Thangal*, the *Angami*, and the *Sema Naga*. The *Zamios liangmei* (the *Kaccha Naga*) and the *Raungmei* (the *Kabui*) are allied tribes (Gori, 1984).

Kuki-Chin tribe groups comprise of the *Aimol*, the *Chothe*, the *Chiru*, the *Kom*, the *Purum*, the *Gangte*, the *Paite*, the *Simte*, the *Thadou*, the *Vaiphei*, the *Hmar*, the *Zon*, the *Jalte* and the *Any Mizas*. *Lushai* are in Non-Naga tribes. The *Anals* are, ethnologically, belong to the *Kuki-Chin* family and these tribes live in the Sadar hills, Churachandpur, Jiribam and Tengnoupal sub - divisions of Manipur (Gori, 1984).

The valley population comprises the *Meiteis* (including Hindus), the *Pangals* (Manipuri Muslims) and the Nepalese. The Bengalis, the Jains and the Sikhs, the Marwaris and the Biharis live mainly in the towns and are engaged in trade and commerce and other tertiary activities.

The ten important tribes live in Senapati district are *Mao, Thadou, Tangkhul, Maram, Kabui, Kacha Naga, Vaiphei, Kom, Chiru* and *Maring*. The important tribes living in Tamenglong district are *Kabui, Kaccha Naga, Thadou, Gangte, Chiru* and *Hmar*. In Churachandpur district, *Paite, Hmar, Thadou, Vaiphei, Zou, Gangte, Any Miza (Lushai), Simte, Kom* and *Kabui* are the important tribes. *Maring, Anal, Thadou, Lamngang, Zou, Moyon, Chothe* and *Aimol* are the important tribes of Chandel district. In Ukhrul district, *Tangkhul* is the predominant tribe followed by *Thadou* and *Vaiphei*. *Kabui, Tangkhul, Kom, Hmar, Thadou, Paite* and *Zou* are important tribes in valley districts. Thus, in Manipur, *Tangkhul* tribes forms the biggest

group on the basis of population followed by *Thadou*, *Mao*, *Paite*, *Hmar*, *Kabui*, *Vaiphei*, *Kaccha Naga*, *Zou* and *Maring* etc.

2.4: Economic Structure

With the available natural resources and optimum climate, Manipur offers a good scope for the growth of industries based on forest. The fertile river valleys of Manipur are well-suited for agriculture and horticulture, the water bodies and the marshes for fisheries and poultry, the foothills for livestock and dairying and the hill areas with rich forests and minerals for the development of industries.

2.4.1: Horticulture

The state is well suited for development of horticulture with its varied relief and climate. The Central Valley is ideally suited for the cultivation of fruits like *papaya*, banana and mango and the hill areas for pineapple, orange, banana, pear, peach and lemon. However, only about 5.14 per cent of the total cultivated land are used for fruit crops and 6.13 per cent for vegetables and spices.

A number of fruits like orange, banana, lemon and cashewnut grow well on the western hills, especially in Tamenglong district. Pear, peach and plum are grown in Senapati and Ukhrul districts. Pineapple is widely grown on the hill slopes mainly in Churachandpur and Chandel districts and on the hillsides bordering the valley.

Table 2.3: Estimated area under some non-cereal crops in Manipur.(1995-2000)

('000 hectares)

Sl.No.	Name of the cereal crops	1995-9	1996-9	1997-9	1998-9	1999-2000
1.	Pineapple	0.57	0.63	0.46	0.24	0.30
2.	Orange	1.06	1.07	0.99	1.65	1.66
3.	Lemon	0.90	0.84	0.67	0.93	0.82
4.	Banana	3.07	3.30	4.41	2.90	3.51
5.	Papaya	0.10	0.04	0.06	0.07	0.09
6.	Other fruits	-	-	1.02	1.00	0.66

Source: Statistical Abstract of Manipur 2001, Directorate of Economics and Statistics, Govt. of Manipur.

A large variety of vegetables like potato, peas, cabbage, cauliflower, brinjal, tomato, pumpkin, chillies and ginger cover a large part of the valley as well as the hills. Chillies and ginger are cultivated on commercial scale in Churachandpur district and potato in Tamenglong district.

2.4.2: Livestock and Fisheries

The livestock and fisheries in Manipur though quite large in numbers cannot be considered satisfactory as regards the quality. The animal wealth consists of cattle, buffaloes, sheep, goats, horses, pigs, and other domestic animals besides poultry and fish. Cattle and buffalo are the most important animal in dairy farming. They provide motive power in the wet valley cultivation. The hill people as well as the valley dwellers rear pigs and poultry.

Table 2.4: Livestock and Poultry in Manipur (1997)

Sl. No.	Item	Senapati	Tamen glong	Churach andpur	Chandel	Ukhrul	Imphal (E+W)	Thoubal	Bishnu pur	Manipur
1.	Cattle	103,384	27,745	18,374	35,487	29,855	159,442	80,755	53,222	508,264
2.	Buffaloes	38,226	8,224	5,223	6,308	20,617	5,470	7,384	3,797	95,249
3.	Sheep	6,046	-	196	96	44	857	289	5	7,533
4.	Goat	15,384	7,132	1,588	785	1,063	4,038	2,531	421	32,942
5.	Horses and Ponies	125	43	314	239	49	1,040	302	215	2,327
6.	Pigs	141,352	53,561	31,560	69,518	43,833	20,257	22,078	5,907	388,066
7.	Mithun	853	1,908	1,283	2,938	9,678	-	-	-	16,660
8.	Dog	41,306	17,303	5,110	17,897	10,241	26,895	20,588	6,413	145,753
9.	Camel	-	-	-	-	-	-	-	-	-
10.	Other livestock	425	18	-	-	74	1,572	32	87	2,212
11.	Total livestock	347,101	115,934	63,648	133,268	115,458	219,571	133,959	70,067	1,199,006
12.	Poultry	468,229	241,808	215,427	275,292	285,336	925,508	321,556	323,478	3,056,634

Source: Statistical Abstract of Manipur, 2001, Directorate of Economics and Statistics, Govt. of Manipur.

Cattle are found in large number both in hill and valley districts. A total of 214,845 cattles are found in hill districts with 103,384 cattles in Senapati district, 35,487 cattles in Chandel districts, while a total of 293,419 cattles are found in valley districts with 159,442 cattles in Imphal (East and West) districts, 80,755 cattles in Thoubal district and 53,222 cattles in Bishnupur.

Buffaloes are also found in large numbers. A total of 78,598 buffaloes are found in hill districts and a total of 16,651 in valley

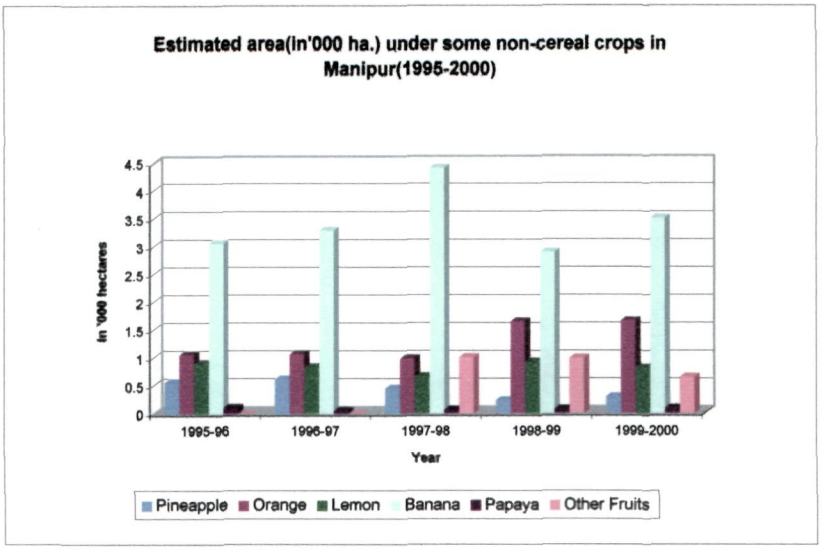


Fig. No. 2.8

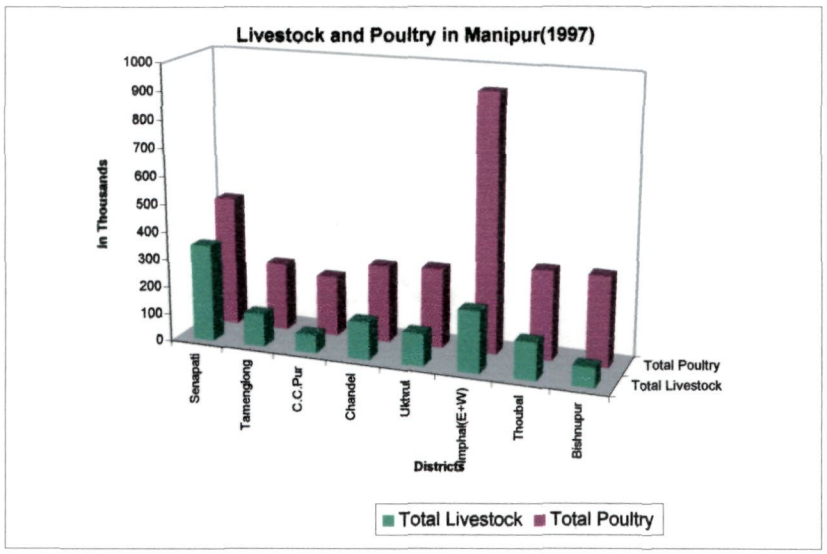


Fig. No. 2.9

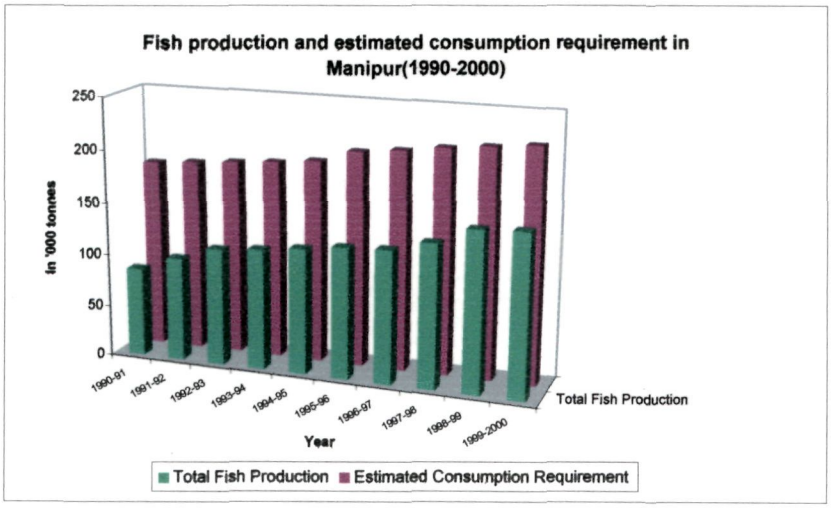


Fig. No. 2.10

Source: Statistical Abstract of Manipur (2001), Directorate of Economics and Statistics, Govt of Manipur

districts. In hill regions, 6,382 sheeps are found. Senapati district alone has 6,046 sheeps. The number of sheeps in valley is negligible. Other domestic animals are also found in large number except for camels.

Poultry birds are reared throughout the state. About 1,486,092 are found in hill districts while in valley, it is 1,570,542.

Though the state has a considerable fishing ground with numbers of lake and marshes, rivers and streams etc., the production of fish is far short of requirements. But fishing is an important occupation of the rural population living around the Loktak Lake and other lakes in the valley.

Table 2.5: Fish farm, production, revenue and estimated consumption of Manipur (1990-91 to 1999-2000)

Year	No.of fishery divisions	No. of fish farms	Total fish production (in tonnes)	Fishery revenue (in rupees)	Estimated consumption requirement (in tonnes)
1990-91	1	14	8,500	520,000	18,000
1991-92	1	14	9,950	519,000	18,300
1992-93	1	14	11,200	473,000	18,610
1993-94	1	14	11,505	492,000	18,940
1994-95	1	14	12,010	573,000	19,300
1995-96	1	14	12,502	676,000	20,513
1996-97	1	14	12,705	412,000	20,990
1997-98	8	14	13,700	548,000	21,474
1998-99	9	19	15,309	502,000	21,859
1999-2000	9	19	15,506	760,000	22,239

Source: Statistical Abstract of Manipur, 2001, Directorate of Economics and Statistics, Manipur

With the increase of fishery division from 1 in 1990-91 to 9 in 1999-2000, number of fish farm also increased from 14 in 1990-91 to

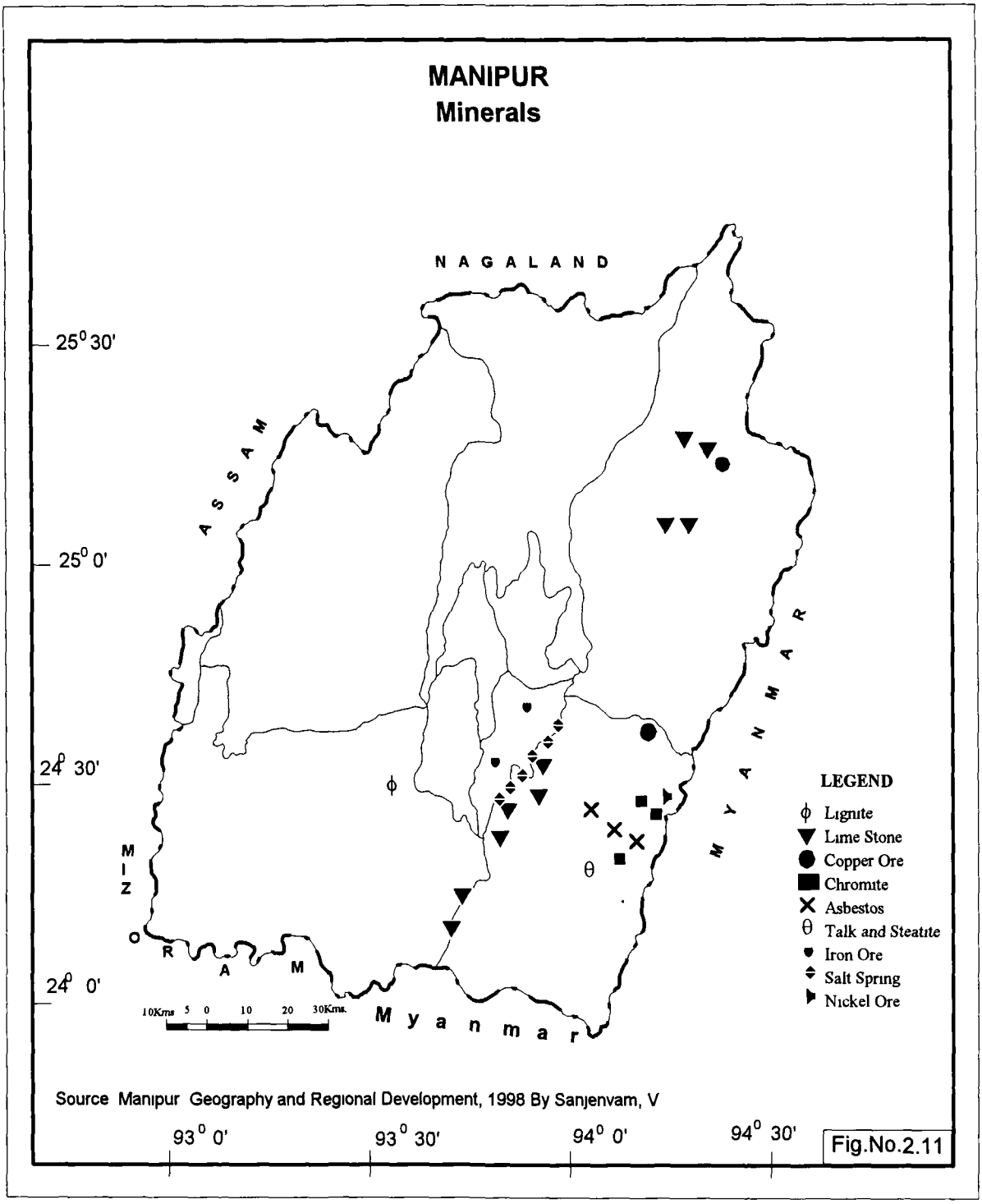
19 in 1999-2000. Though fish production in Manipur increased from 8,500 tonnes in 1990-91 to 15,506 tonnes in 1999-2000, the production is far less than the estimated requirements. In 1999-2000, about 22,239 tonnes of fish were estimated as requirement against the production of 15,506 tonnes.

2.4.3: Minerals and Power resources

Manipur is not rich in mineral resources. The hill areas are endowed with rich deposits of limestone, chromite, lignite, nickel, copper, asbestos and salt. There are also possibilities of oil (petroleum) being found and the ONGC (Oil and Natural Gas Commission) of Government of India is engaged in exploring it. Except for limestone with an estimated reserve of 8.09 million tonnes, no other mineral is being exploited on a commercial scale.

Limestone is found at Hundung, Khankhui, Mova, Kasom and Lambui in Ukhrul district, Pallel - Chakpikarong belt of Chandel district and Monbung in Churachandpur district. Lignite with proved reserves of 12,200 tonnes has been located in the stream basin near Kongvai village in Churachandpur district. Considerable quantities of chromite, nickel, copper and asbestos have been estimated in the state, which are found mainly in Ukhrul and Chandel districts. Besides, numbers of salt spring occurs along the foot-hills in the eastern part of Manipur valley (fig.2.11).

With the commissioning of the 105 MW Loktak Hydro - Electric Project in 1984, the state has shown a marked improvement in the


MANIPUR
Minerals
NAGALAND
ASSAM
MIZORAM
MYANMAR
Myanmar
25° 30'
25° 0'
24° 30'
24° 0'
93° 0'
93° 30'
94° 0'
94° 30'
10Kms 5 0 10 20 30Kms.
LEGEND
Lignite
Lime Stone
Copper Ore
Chromite
Asbestos
Talk and Steatite
Iron Ore
Salt Spring
Nickel Ore
Source Manipur Geography and Regional Development, 1998 By Sanjenvam, V
Fig.No.2.11

power supply position. The peak load demand of the state is around 100 MW, of which it recieves 50 MW from the Loktak Power Grid System, and to meet its increasing demands, it generates about 10 MW of power from diesel and hydel power plants and purchases part of its requirements from neighbouring states.

Table 2.6: Districtwise installed capacity and electricity generated in Manipur (1999-2000)

Districts	Installed capacity (MW)			Generated (Million KWH)		
	Total	Hydel	Thermal	Total	Hydel	Thermal
Imphal East	0.100	-	0.100	0.018	-	0.018
Imphal West	6.888	-	6.888	0.404	-	0.404
Thoubal	0.200	-	0.200	-	-	-
Bishnupur	-	-	-	-	-	-
Senapati	1.300	1.300	-	0.407	0.407	-
Tamenglong	1.017	-	1.017	-	-	-
Churachandpur	0.448	-	0.448	-	-	-
Chandel	0.400	0.400	-	-	-	-
Ukhrul	1.500	1.500	-	-	-	-

Source: Statistical Abstract of Manipur 2001, Directorate of Economics and Statistics, Manipur.

Table 2.7: Villages electrified in Manipur (1992-2000)

Year	Inhabited villages	Electrified villages	Percentage of electrified villages to the total
1992-93	2,182	1,697	77.77
1993-94	2,182	1,525	69.89
1994-95	2,182	1,590	72.87
1995-96	2,182	1,748	80.11
1996-97	2,182	1,888	86.53
1997-98	2,182	1,940	88.91
1998-99	2,182	1,990	91.20
1999-2000	2,182	2,001	91.70

Source: Statistical Abstract of Manipur 2001, Directorate of Economics and Statistics, Govt. of Manipur.

In 1992-93, about 77.77 per cent of the total villages of Manipur were electrified but it decreased to only 69.89 per cent in 1993-94. Then, an increasing trend was observed. There were 91.70 per cent electrified villages in 1999-2000. Almost all the villages of the valley are electrified. In the hill districts, due to hilly topography, bad climate conditions etc., all villages are not electrified. Maximum electrification was found in Senapati, Ukhrul and Chandel districts followed by Churachandpur and Tamenglong districts.

2.4.4: Industry

Industrially, the state is least developed even though it has good scopes to develop industries based on forest, mineral and agricultural resources. Some important small and medium sized industries of Manipur are the Khandsari Sugar Factory at Khangabok (Thoubal), Manipur Spinning Mill at Loitang Khunou (Imphal West), Mini Cement plant at Hundung (Ukhrul), Bamboo Chipping plant at Kadamtala, Jiribam (Imphal East), Manipur Vanaspati and Allied Industries and drug and pharmaceuticals plant at Nilakuthi (Imphal East), Manipur Electronics assembling television and radio sets, and cycle assembling plants at Takyel Industrial Estate (Imphal West). Besides these industries, there are a large number of agro - based industries such as rice mills, saw mills, flour and dal mills along with brick kilns in different parts of the state.

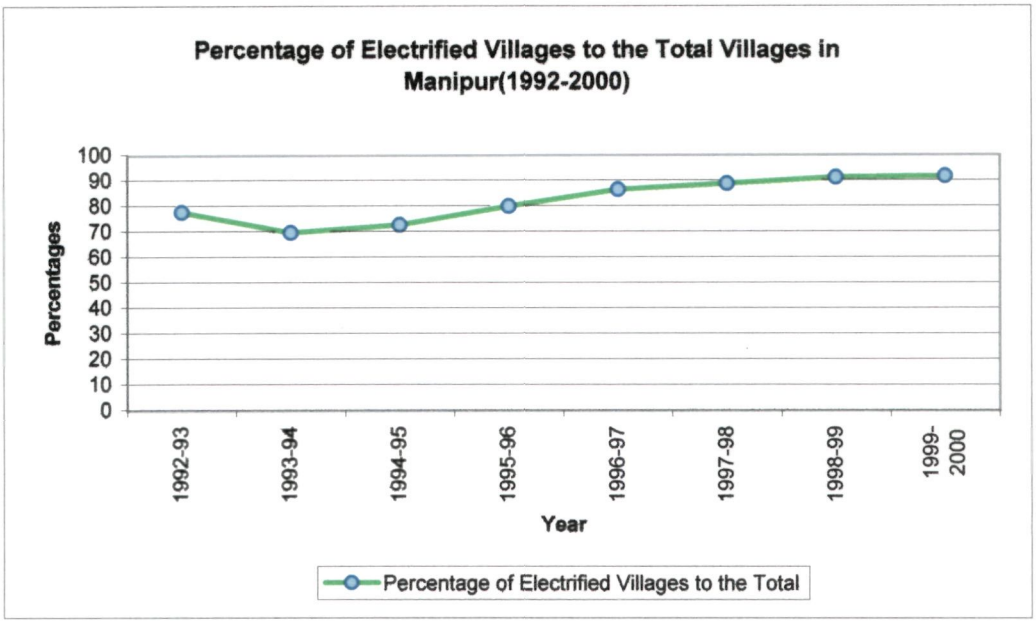


Fig. No. 2.12

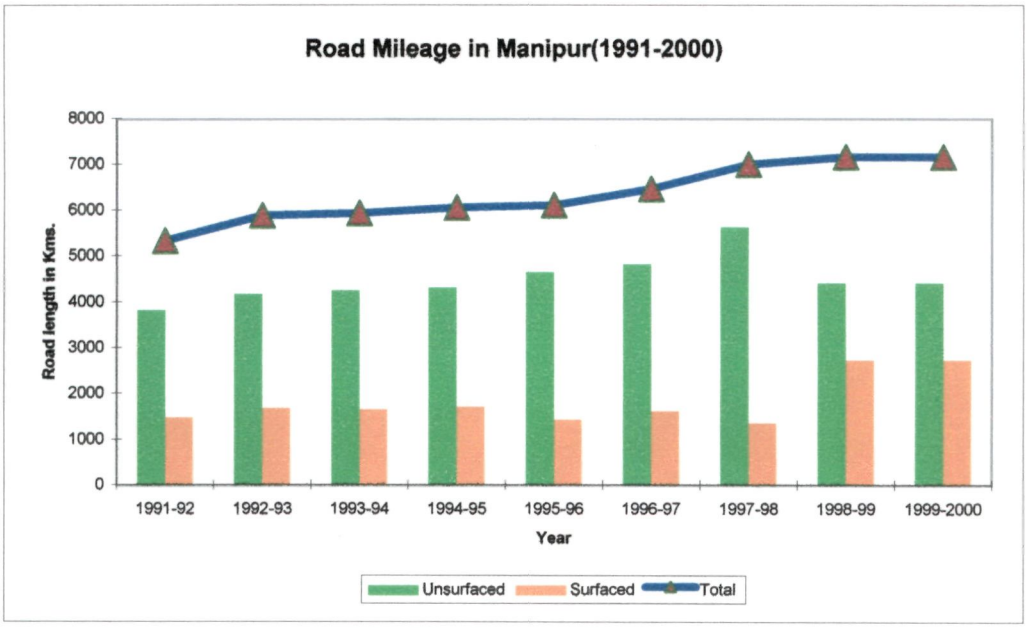


Fig. No. 2.13

Source: Statistical Abstract of Manipur (2001), Directorate of Economics and Statistics, Govt of Manipur

Thus, in Manipur, 1986 factories of different categories were registered in 1998. There were only 1,634 registered factories in 1990. Among the non-agricultural activities, household industry is the most important. Handloom and handicraft industries are developed traditionally in Manipur since the earliest time. The oldest method and universal cottage industries - handloom is doing mainly in Central Valley and loinloom in hill areas, have became and integral part of the traditional culture of the people. The Manipuri women on their looms weave wide range of colourful clothes and shawls of intricate geometric designs. Embroidery, metalware, cane and bamboo works, doll and ornament manufacturing are among important handicrafts.

The products of handicrafts and handlooms of Manipur were for domestic use but now it has become important items for national and even international markets. To boost-up the income of those already employed in this sector and to increase the production with provisions of employment of large number of people, it is necessary to organize this sector on commercial line with proper infrastructural support and financial aid.

2.4.5: Transport and Communication

Development of transport and communication of a region is related with the prevailing relief and human environment. Manipur is a state of highly rugged topography and abnormal human environment where the development of road transport and railways are difficult. Besides, communication networks are also not in good conditions.

The existing transport network of 7,172 kms. road in 1999-2000 with 4,427 kms. of surfaced road and 2,745 of unsurfaced road, 135 kms. of railway are not, obviously, adequate for the state. The road density of 32 kms. per 100 sq.kms., as the Indian Road Congress norms of 32 kms., is far less than the national average. Only about 45 per cent of the villages are connected by road while many villages are still not connected with district headquarters or state capital by all-weather roads. Only in good weather season with no rain, villages are connected in bad conditions.

Table 2.8: Road Mileage of Manipur (in km.) (1991-2000)

Year	National highways	State high-ways	Major district roads	Other district roads	Inter village roads	Municipal roads	O.M.N.P.	Total	Surfaced	Unsurfa-ced
1991-92	434	880	1,037	480	2,398	122	115	5,344	3,841	1,503
1992-93	434	1,158	1,010	744	2,428	122	122	5,896	4,192	1,704
1993-94	434	1,158	1,014	747	2,468	122	128	5,949	4,271	1,678
1994-95	434	1,158	1,029	797	2,518	122	132	6,068	4,333	1,735
1995-96	434	1,271	713	683	2,877	122	138	6,116	4,668	1,448
1996-97	434	1,271	713	767	3,145	122	142	6,472	4,839	1,633
1997-98	434	1,603	740	882	3,348	122	-	7,011	5,637	1,374
1998-99	957	675	964	1,013	3,563	122	-	7,172	4,427	2,745
1999-2000	957	675	964	1,013	3,563	139	-	7,172	4,427	2,745

Source: Statistical Abstract of Manipur 2001, Directorate of Economic and Statistics, Manipur.

The roads have been classified into six categories on all-India pattern- National Highway, State Highway, major district roads, other district roads, inter-village roads and municipal roads (Table 2.8).

The National highway no. 39 and 53 connect the state with the rest of the world through Nagaland and Assam. It also connects Imphal with Myanmar in the eastern side. The total road length under national Highway was 957 kms. in 1999-2000. The state highways connect the district headquarters with Imphal with a total length of 675 kms.(1999-2000). District roads linked with block and sub-divisional headquarters with the district headquarters. The inter-village roads, mostly unsurfaced, connect the villages with each other and join the nearest district roads and state highways while the municipal roads connect various parts of Imphal City.

With the available large number of vehicle in Imphal valley, there is wide road network but the hill districts are less accessible with sparse and low quality road network. The roads in general are of poor quality and need improvement in their surface structure.

Manipur lacks in water transport system. The Jiri and Barak rivers provide more or less effective water transport system in Jiribam subdivision for movement of goods and people. A very short, having about 1.35 kms. long metre guage railway line linked Jiri of Manipur with Silchar of Assam. People living in and around the Loktak Lake use canoes and small boats for inter-village and inter-house transport.

Indian Airlines liked Imphal with Calcutta, Guwahati, Delhi and Silchar.

There are 676 post offices with 1 head post office in the heart of Imphal and 50 sub-post offices (1997-98).

There are 2 telegraph offices, 34 telephone exchanges, 48 combined post and telegraph offices, 27,992 telephones working, 1,007 P.C.O. and 699 long distance public call offices in Manipur (2000). Besides, Imphal has a medium and shortwave radio station and a Doordarshan Kendra. A large number of newspapers both in English and Manipuri languages are publishing from Imphal as well as from Churachandpur. In 1999, there are 139 newspapers and periodicals published in Manipur with 51 daily, 3 bi or tri-weeklies, 12 weeklies, 11 fortnightlies, 39 monthlies, 9 quaterlies, 4 annual and 10 other periodicals.

2.4.6: Occupational Structure

Occupational structure of a region or a state shows the level of socio-economic conditions of the region. Manipur is a state having about 2.4 million populations of which 70 per cent directly depend on agriculture. In 2001, 44.79 per cent of the total population of the state are workers. Of the total workers, 70.73 per cent are main workers while remaining 29.27 per cent are marginal workers. Non-workers form 55.21 per cent of the total state's population.

Table 2.9: Percentage of Workers and Non-workers in Manipur, (2001)

Sl.No.	Districts	Main Workers	Margianl Workers	Non-Workers
1.	Imphal East	27.12	12.96	59.92
2.	Imphal West	28.48	11.36	60.16
3.	Thoubal	31.29	18.18	50.53
4.	Bishnupur	27.09	16.84	56.07
5.	Senapati	38.21	11.78	50.00
6.	Tamenglong	39.93	6.58	53.48
7.	Churachndpur	31.68	12.32	56.00
8.	Chandel	33.58	12.71	83.71
9.	Ukhrul	36.67	10.69	52.64
Total Valley districts		28.63	14.38	56.99
Total Hill districts		36.10	11.26	52.64
Total Manipur		31.67	13.11	55.21

Source: Census of India 2001 (Provisional), Directorate of Census Operations, Manipur.

The proportion of main workers are higher in the hilly districts than the valley districts. Tamenglong district has 39.93 per cent main workers, Senapati district has 38.21 per cent, Ukhrul district has 36.67 per cent, Chandel district has 33.58 per cent and Churachandpur district has 31.68 per cent main workers population. Among the valley districts, Thoubal has the highest percentage of main workers (31.29 per cent).

On the contrary, valley districts have higher percentage of marginal workers than hill districts. Thoubal district has 18.18 per cent

marginal workers (highest among the districts) followed by 16.84 per cent in Bishnupur district, 12.96 per cent in Imphal West and 11.36 per cent in Imphal East districts. Among the hill districts, Chandel district has the highest proportion of marginal workers with 12.71 per cent of the total population of the district followed by 12.32 per cent in Churanchandpur district, 11.78 per cent in Senapati district, 10.69 per cent in Ukhrul district and 6.58 per cent in Tamenglong district. The higher participation rate (the percentage of main workers to the total population) in Manipur is due to high female participation in labour intensive works.

Table 2.10: Percentage of Occupational Structure of Manipur (2001)

Sl. No.	Districts	Cultivators	Rank	Agricultural labourers	Rank	Household industry workers	Rank	Other workers	Rank
1.	Imphal East	20.08	9	14.32	3	15.16	1	50.45	2
2.	Imphal West	21.14	8	9.12	5	13.47	2	56.27	1
3.	Thoubal	41.01	6	20.47	1	10.94	4	27.58	4
4.	Bishnupur	31.76	7	15.50	2	12.83	3	39.91	3
5.	Senapati	76.19	2	7.32	7	2.82	8	13.67	9
6.	Tamenglong	77.94	1	1.69	9	1.45	9	18.91	8
7.	Churachandpur	55.82	5	10.18	4	7.16	5	26.84	5
8.	Chandel	61.24	4	7.45	6	5.74	6	25.57	6
9.	Ukhrul	70.31	3	2.95	8	3.27	7	23.47	7
Total Valley districts		28.38		14.82		13.06		43.74	
Total Hill districts		69.40		6.68		4.00		19.90	
Total Manipur		46.31		11.31		9.16		33.47	

Source: Census of India, 2001 (Provisional), Directorate of Census Operations, Manipur.

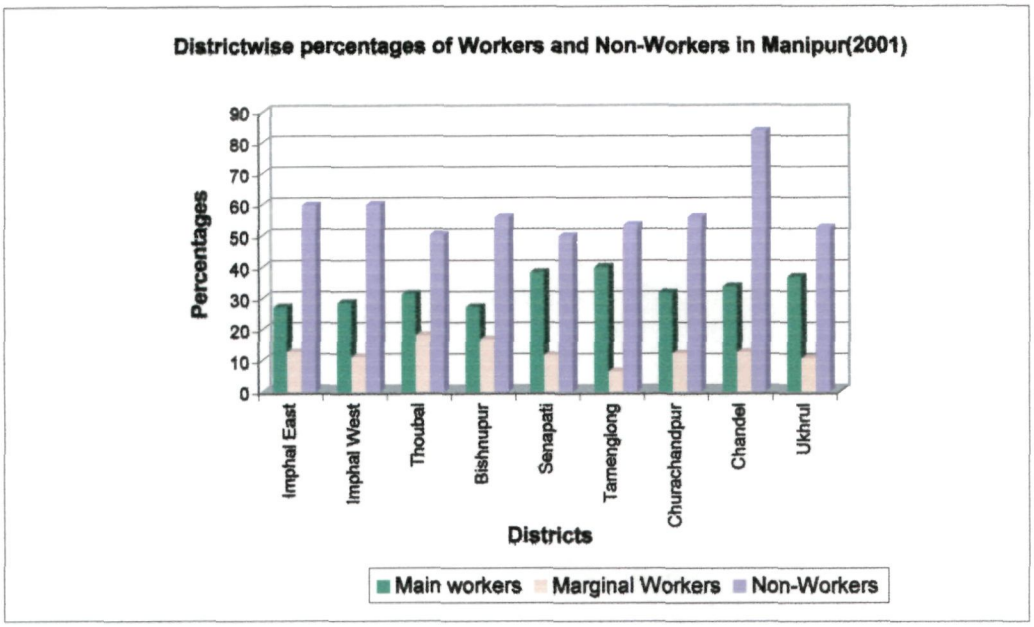


Fig. No. 2.14

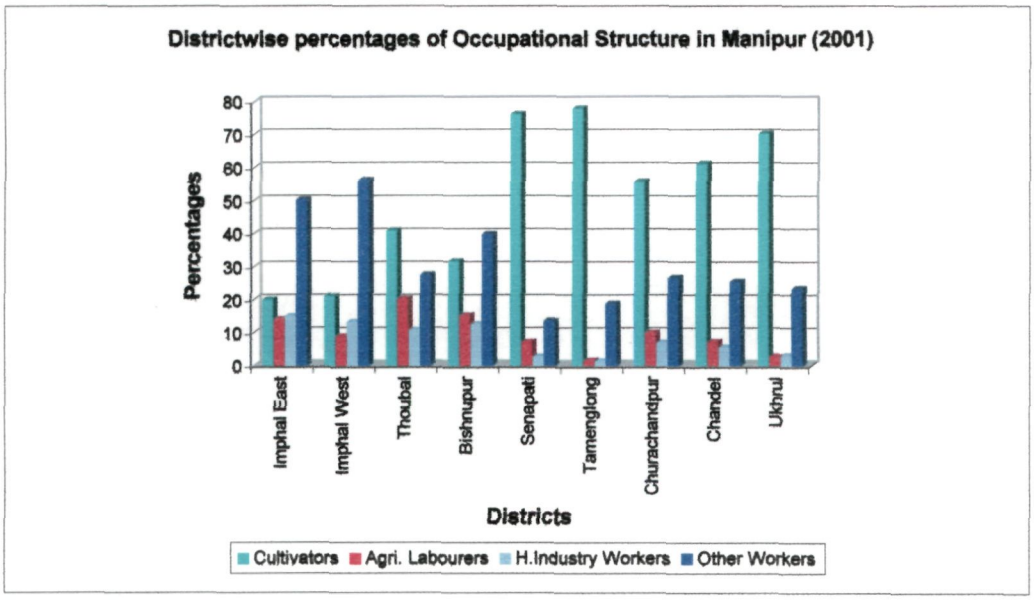


Fig. No. 2.15

Source: Census of India, 2001 (Provisional), Directorate of Census Operations, Manipur

Thus, the proportion of employment in the agricultural sector is very high in Manipur. The percentage of cultivators are high particularly in hill districts with 77.94 per cent of the total workers in Tamenglong district followed by 76.19 per cent in Senapati district, 70.31 per cent in Ukhrul district, 61.24 per cent in Chandel district and 55.82 per cent in Churachandpur district. In valley districts, Thoubal district has the highest percentage of cultivators (41.01 per cent) followed by Bishnupur district (31.76 per cent), Imphal West (21.14 per cent) and Imphal East (20.08 per cent). Valley districts have higher percentage of agricultural labourers. Thoubal district has the highest percentage (20.47) of agricultural labourers among the valley districts, followed by 15.50 per cent in Bishnupur district, 14.32 per cent in Imphal East district and 9.12 per cent in Imphal West district.

The proportions of workers in the household industries are also higher in valley districts. It constitutes 15.16 per cent in Imphal East district, 13.47 per cent in Imphal West district, 12.83 per cent in Bishnupur district and 10.94 per cent in Thoubal district. Churachandpur district has highest percentage (7.16) of household industry workers among the hill districts.

A large number of workers are also engaged in tertiary sector like government services and they are categorized as other workers. The proportion of such workers ranges from 56.27 per cent in Imphal West district to 13.67 per cent in Senapati district.

CHAPTER – III

NATURE OF AGRICULTURE IN MANIPUR

Situated in the extreme eastern part of the country, bordering Myanmar, Manipur has for long been part and parcel of Indian tradition. Although it is a hilly and forested area, it has occupied a strategic position in the evolution of the country's socio-economic stand. Almost nine-tenth of the state is hilly extending wide variations in altitude ranging from 900 metres in the south to 3,000 metres in the north. The state has a sub-tropical monsoonal to temperate climate depending on the elevation. It receives rain from monsoon and the rainfall varies from 1,016 mm. to 1,778 mm. in a year. All these factors affect the state's agriculture in the vivid manner.

In this chapter an attempt is made to assess the nature of agriculture practised in Manipur. This chapter is based on secondary source of data and is divided into three parts. The first part deals with the agricultural systems, the second part deals with the historical background of shifting cultivation and the third part deals with the distribution and nature of shifting cultivation or *jhuming*.

Manipur is essentially an agrarian state and the population is mostly rural in character. Cultivation of crops is the dominant economic activity, though people living in and around the developing urban areas take up various other occupations and thus, agriculture in some areas has become somewhat secondary occupation. People living in rural areas still continue agriculture as the mainstay of life, which forms the basis of their economy. Out of the total main workers of Manipur, about 69 per cent are engaged in the agricultural sector alone.

This shows the agrarian economy of the state. The contribution of agriculture including livestock to the Net State Domestic product is 41.61 per cent at current price (Census of India, 2001). A good agricultural year always shows a positive growth of state Domestic Product. Small size of land holding is a big constraint for the upliftment of agriculture in this state. Unorganized and unskilled agricultural labourers also creates hindrance to the mechanization and modernization of agricultural practices. Not only these hindrances but there are also other agricultural constraints such as the transport and communication system, lack of irrigation, fertilizers, banking and marketing facilities, agro-based industries, co-operatives, maladministrative practices etc.

Table 3.1: Land Utilization in Manipur (1997-98)*

S.No.	Category	Area (Sq.km.)	%age to the total area
1.	Total Geographical area	22,327.00	100.00
2.	Forest including pasture and barren	17,418.00	78.00
3.	Agricultural land	338.04	1.50
4.	Crop land	2,242.72	10.00
5.	Current Jhum	2,035.11	9.20
6.	Urban land	293.13	1.30

Note: * 1997-98 data was available.
Source: Statistical Bulletin of Manipur Forest, 1997-98, Deptt. of Forest, Govt. of Manipur.

A perusal of table 3.1 shows that out of the total geographical area, 78 per cent is under forests including pastures and barren land, nearly 21 per cent of land is under cultivation and 1.3 per cent of land is under urban areas.

Manipur is very rich in various types of flora like different varieties of orchids, bamboo and various types of trees. The variety of trees ranges from tropical evergreen with tropical moist-deciduous to dry temperate coniferous trees of sub-tropical forest. The most important trees are *Sahi* (Castanopsis indica), *Tera* (Salmalia Malabarica), *Heinou* (Mangifera Indica), *Tairen* (Cedrela-toona), *Uyung* (Quercus genera), *Heirukokthong* (Artocaupus Hieruta), *Tumitla* (Cinnamomum Ceceodephne), *Uningthon* (Phoecha Hensiana), *Uchan* (Pinus longifolia), *Usoi* (Schimawallichii), *Chingsu* (Tectona grandis), *Agar* (Aquilaria agallocha), *Mekruk* (Canarium), *Uthambal* (Magnolia fuscutta) etc.

Table 3.2: Cropped area and cropping intensity of Manipur (in hectares)

Year	Net Sown area	Area sown more than once	Total Cropped area	Intensity Index
1993-94	153,808	6,226	160,034	104.04
1994-95	154,031	6,235	160,268	104.04
1995-96	153,772	6,752	160,524	104.39
1996-97	154,966	9,013	164,779	106.33
1997-98	154,981	10,387	165,368	106.70
1998-99	155,136	10,478	165,614	106.75
1999-2000	155,256	10,728	165,984	106.91
2000-01	155,556	11,078	166,634	107.12

Source: (i) Statistical Handbook of Manipur,1991.
(ii) Statistical Abstract of Manipur, 2001, Directorate of Economics and Statistics, Govt. of Manipur.

A perusal of table 3.1 shows that nearly 21 per cent of the total area is under cultivation, of which, 1.50 per cent is agricultural land, 10 per cent is cropped land and 9.2 per cent is under current *jhum* in

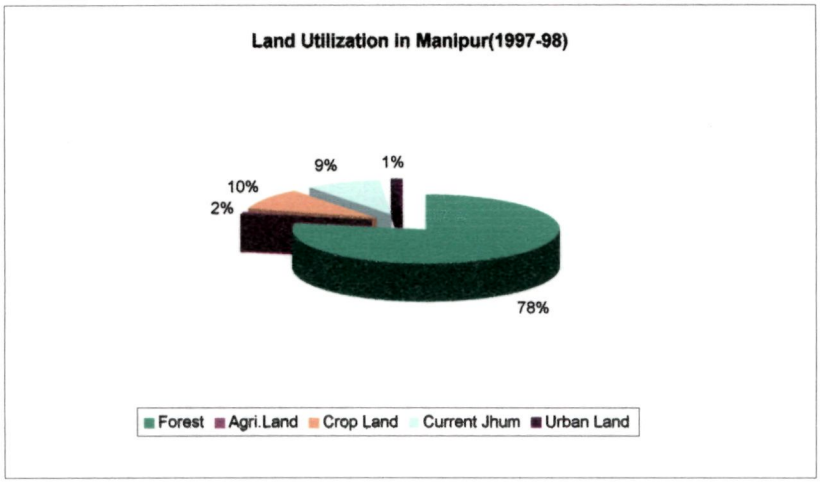


Fig. No. 3.1

Source: Statistical Bulletin of Manipur Forest, 1997-98, Department of Forest, Govt. of Manipur

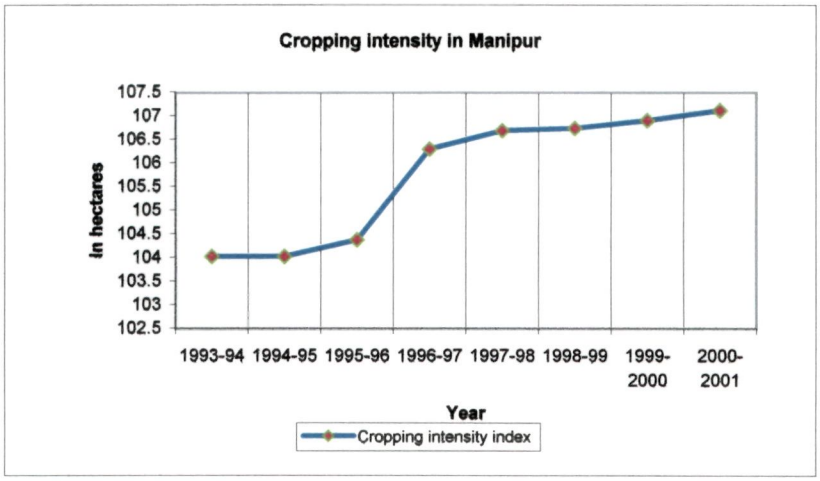


Fig. No. 3.2

Source: Statistical Abstract of Manipur (2001), Directorate of Economics and Statistics, Govt of Manipur

the hill areas. Table 3.2 is showing the net sown area, area sown more than once, total cropped area and cropping intensity of Manipur from 1993-94 to 2000-2001. The figures show that the net sown area has increased by 1.12 per cent, area sown more than once by 43.80 per cent and total cropped area has increased by 3.96 per cent during the last eight years. The cropping intensity, which was 104.04 in 1993-94, has increased to 107.12 in 2000-01.

The per capita cultivable land has been decreasing day by day with increasing population roughly at the rate of 0.2 million in every 10 years. Especially in the valley areas, the average land holding is about one hectare. There are many hindrances in the way of development of agriculture. In the valley region little advanced type of agriculture is practised while in the hill areas mostly primitive or *jhum* type of agriculture is practised. Improved agricultural practices adopted in the valley areas include the application of fertilizers, plant protection measures and use of high yielding varieties etc. Consumption of fertilizer has gone up from 45 kg per hectare (1984-85) to 70 kg. per hectare (2000-01). Similarly the area under high yielding varieties has also increased to more than 70,000 hectares (2000-01). About 70 per cent of the cropped area in the valley is under high yielding variety seeds. With the increase of fertilizer consumption and creation of irrigation potential, double cropping is increasing in the valley area. This has given boost to paddy crops. The production of high yielding variety paddy has gone upto more than 2,800 kgs. per hectare (2000-01).

3.1 Agricultural System:

Manipur consists of hills and plains. This undulating topography of the state has compelled the inhabitants to adopt two methods of agriculture.

1. One practised in plains, valleys, foothills and terraced lands on slopes is called settled or permanent agriculture.

2. The other practised on hill slopes of all possible gradients is called shifting cultivation or *jhuming.*

3.1.1: Agriculture in the Valley Districts:

The Manipur valley consisting of about only 10 per cent of the total geographical area of the state. Agriculture in the valley is of subsistence type. The farmers grow two or three cereal crops from the same field in a year. The development of irrigation facilities mainly canals have helped in the intensification of agriculture. Rice is the dominant crop of the valley followed by maize, pulses, oilseeds, sugarcane, vegetables, and potatoes. Valley people have adopted the advanced technology. This has given a boost to agriculture. Tractors are being used both for ploughing and transport purposes. Though the figures of animal operated implements for cultivation is high, draught animals are rarely seen in the valley. In some stages of cultivation like harvesting, the system used is primitive. Machines are not used but traditional implements are used. Some of the traditional agricultural implements which are used are *yoke*, smooth and toothed harrow, cow-

drawn sledge, spade, long *dao*, sickle, triple paddy wooden thresher, paddy spoon and fan, threshing mat, bamboo-baskets etc. Moreover, power tillers and sprayers etc. is also used by the farmers.

Since agriculture is mostly dependent upon the seasonal rainfall, single cropping is a common feature. *Kharif* crop i.e. rice is the main crop cultivated in all the fields. With the increase of irrigation facilities, double cropping has increased. Some major irrigation projects of Manipur are Loktak Lift irrigation, Singda Dam, Thoubal Dam, Khoupum Dam, Imphal Barrage, Sekmai Barrage, Ithai Barrage, Khuga Project, Iril Project etc. These have given boost to agriculture. Usually, rice cultivation is done under two methods, transplantation and non-transplantation method. Transplantation method is widely practised in the wet cultivation. Per hectare production of rice is appreciably high particularly in the alluvial tracts.

Table 3.3: Area, Production and Average Yield of Cereal Crops in Valley Districts of Manipur (2000-2001)

S. No.	Districts	Rice			Maize[1]		
		Area (000 hec.)	Production (000 tones)	Yield (kg/hec.)	Area (000 hec.)	Production (000 tones)	Yield (kg/ hec.)
1.	Bishnupur	18.66	50.32	2,696.68	--	--	--
2.	Thoubal	23.33	60.46	2,591.51	--	--	--
3.	Imphal East	31.17	87.64	2,811.68	--	--	--
4.	Imphal West	15.84	51.31	3,239.27	--	--	--
Total Valley		89.00	249.73	2834.79	--	--	--

Note: 1. Data is not available.

Source: Statistical Abstract of Manipur, 2001, Directorate of Economics and Statistics, Govt. of Manipur.

A perusal of table 3.3 shows that the average yield of rice is highest in Imphal West district with 3,237.27 kgs/hectare followed by Imphal East district with 2,811.68 kg/hectare. Thoubal district has the lowest average yield of rice among the valley districts with 2,591.51 kg. per hectare. Average area operated per holder in the valley district is 1.17 hectare (Table 3.4).

Table 3.4: Number and Area of Operational Holdings in Valley Districts of Manipur(1999)

S. No.	Districts	No. of holdings	Area Operated (in hectares)	Average area operated per holder (in hectare)
1.	Bishnupur	13,408	19,022	1.42
2.	Thoubal	32,624	34,392	1.05
3.	Imphal(E+W)	38,904	46,239	1.19
Total Valley		84,936	99,653	1.17

Source: Statistical Handbook of Manipur, 1999, Directorate of Economics and Statistics, Manipur

Table 3.5: Consumption of Chemical Fertilizers in Valley Districts of Manipur (1999-2000)

S.No.	Districts	Fertilizers (in tones)						%age to total consumptions
		Urea	DAP	MOP	SSP	M. Phos.	Total	
1.	Imphal East	6,852	1,033	499	530	20	8,934	22.54
2.	Imphal West	6,204	1,015	440	355	60	8,074	20.38
3.	Bishnupur	5,179	801	364	423	40	6,807	17.18
4.	Thoubal	10,417	1,321	521	764	30	13,053	32.94
Total Valley		28,652	4,170	1,824	2,072	150	36,868	93.04

Source: Statistical Abstract of Manipur, 2001,Directorate of Economics and Statistics, Manipur.

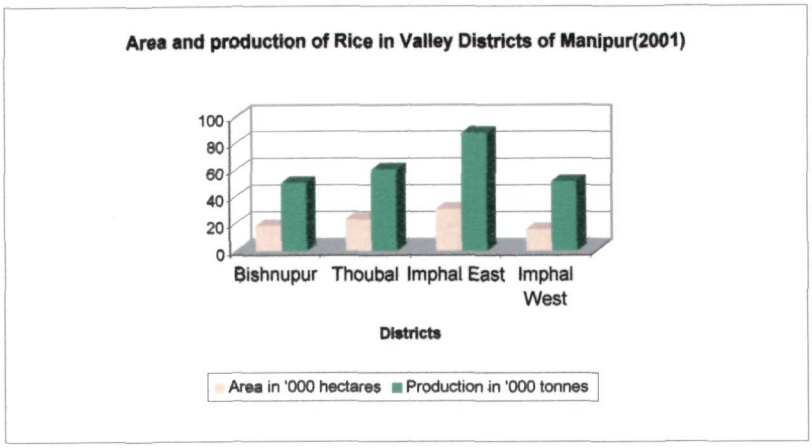


Fig. No. 3.3

Source: Statistical Abstract of Manipur (2001), Directorate of Economics and Statistics, Govt of Manipur

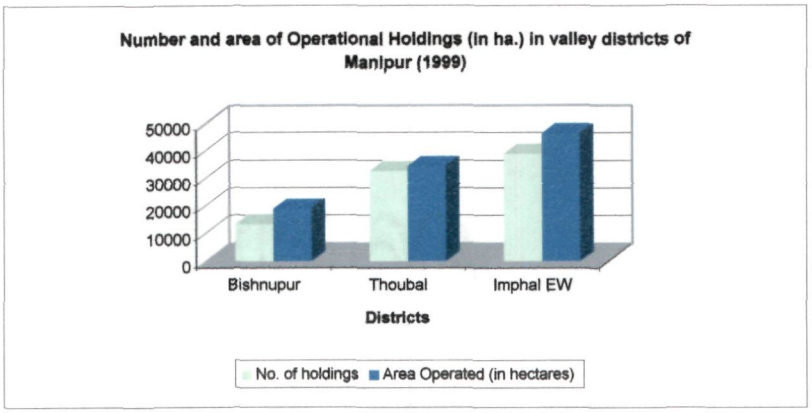


Fig. No. 3.4

Source: Statistical Handbook of Manipur, 1999, Directorate of Economics and Statistics, Manipur

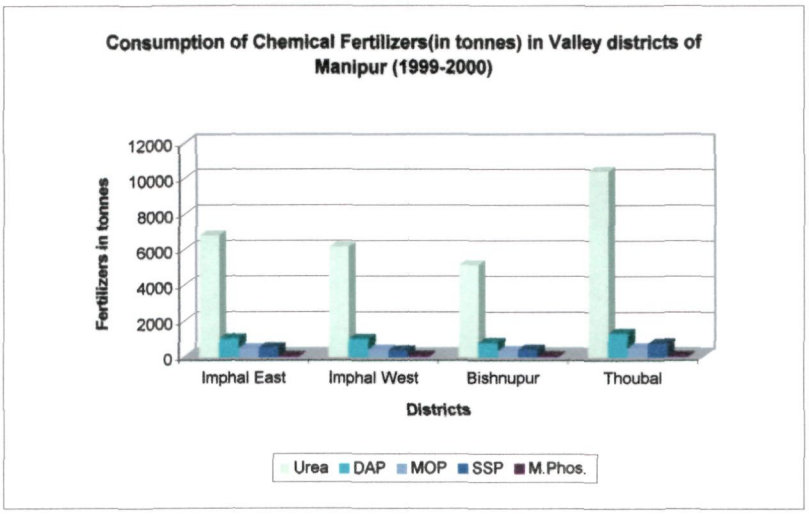


Fig. No. 3.5

Source: Statistical Abstract of Manipur (2001), Directorate of Economics and Statistics, Govt of Manipur

Table 3.5 is showing the consumption of chemical fertilizers in the valley districts. It is observed that the percentage of consumption of chemical fertilizers is comparatively high in the valley districts, i.e. about 93 percent of the state's whole fertilizer consumption. Thoubal district is the greatest consumer of chemical fertilizers with 32.94 percent of the whole states share. Bishnupur district is the lowest consumer among the valley districts.

3.1.2: Agriculture in the Hill Districts:

Jhum or shifting cultivation is also practised in Manipur because a substantial part of the state is hilly and inhabited by the tribal people who have inherited a system, which they cannot easily give up. The non-shifting farming activities are also there in the hilly areas. Rice is the main crop of *jhum* cultivation. The tribal people engaged in *jhum* cultivation also produce a number of other crops apart from rice such as maize, pulses, oilseeds, millets, sugarcane, vegetables and potatoes etc. This system of cultivation is primitive. No high yielding varieties of crops are grown, no irrigation, no ploughing using animals, no application of fertilizers, pesticides and insecticides and no use of any kind of large machines.

From table 3.6 it is observed that the average yield of rice in hill districts is 1,941.73 kgs per hectare. Ukhrul district has the highest average yield of rice -2,409.46 kg per hectare while Tamenglong district has the lowest average yield of rice 1,162.90 kg per hectare (2000-01). Per hectare yield of maize is higher than the yield of rice.

The average yield of maize is 2,325.48 kgs (2000-2001). Chandel district has highest yield of maize - 3,285.71 kgs per hectare.

Table 3.6: Area, Production and Average Yield of Cereal Crops in Hill Districts of Manipur (2000-2001)

S. No.	Districts	Rice			Maize		
		Area (000 hec.)	Production (000 tones)	Yield (kg/hec.)	Area (000 hec.)	Production (000 tones)	Yield (kg/ hec.)
1.	Senapati	23.23	53.23	2,291.43	1.99	4.83	2,427.14
2.	Tamenglong	9.19	10.96	1,192.60	--	--	--
3.	Churachandpur	12.60	23.49	1,864.28	1.86	3.98	2,139.78
4.	Chandel	9.41	11.68	1,241.23	0.14	0.46	3,285.71
5.	Ukhrul	13.53	32.60	2,409.46	0.68	1.59	2,338.24
Total Hill		67.96	131.96	1,941.73	4.67	10.86	2,325.48

Source: Statistical Abstract of Manipur, 2001, Directorate of Economics and Statistics, Manipur.

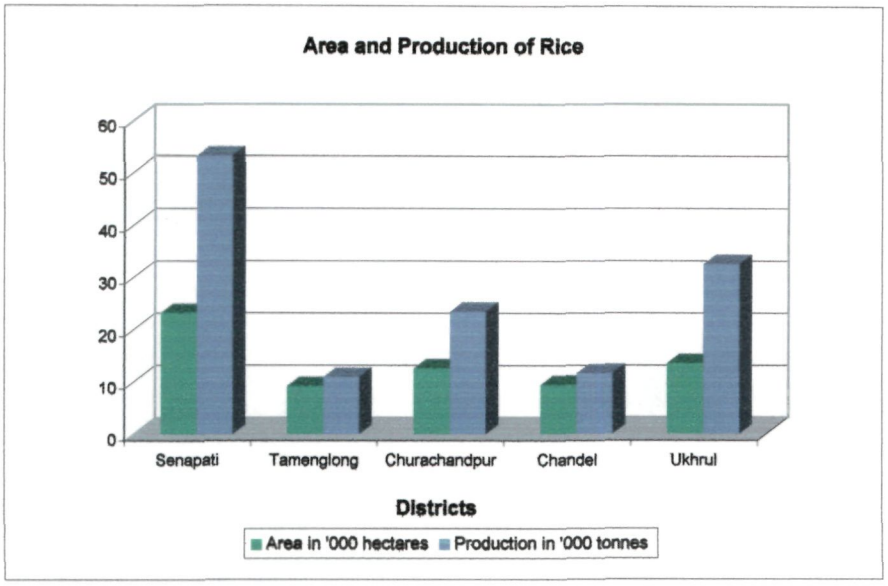
Table 3.7: Number and Area of Operational Holdings in Hill Districts of Manipur (1999)

S. No.	Districts	No. of holdings	Area Operated (in hectares)	Average area operated per holder (in hectare)
1.	Senapati	20,318	22,416	1.10
2.	Ukhrul	11,270	15,274	1.36
3.	Tamenglong	7,407	16,305	2.20
4	Churchandpur	12,124	11,843	0.98
5.	Chandel	6,016	9,490	1.58
Total Hill		57,135	75,328	1.32

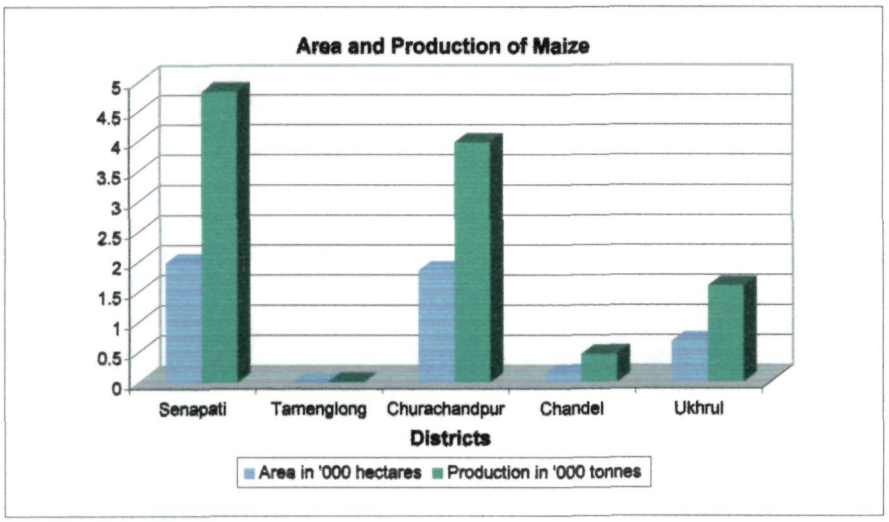
Source: Statistical Handbook of Manipur, 1999, Directorate of Economics and Statistics, Manipur.

A perusal of table 3.7 shows that the average area operated per holder in hill districts is 1.32 hectare. The figure ranges from 0.98 hectare in Churachandpur district to 2.20 hectare in Tamenglong

AREA AND PRODUCTION OF CEREAL CROPS IN THE HILL DISTRICTS OF MANIPUR (2000-2001)



(a)



(b)

Fig. No. 3.6

Source: Statistical Abstract of Manipur (2001), Directorate of Economics and Statistics, Govt. of Manipur

district. Senapati district has 1.10 hectare as operated area per holder while Ukhrul and Chandel districts have 1.36 hectare and 1.58 hectare area operated per holder respectively (1999).

Table 3.8: Consumption of Chemical Fertilizers in Hill Districts of Manipur (1999-2000)

S.No.	Districts	Fertilizers (in tones)						%age to total consum ptions
		Urea	DAP	MOP	SSP	M.Phos.	Total	
1.	Senapati	585	185	81	--	--	851	2.15
2.	Tamenglong	325	70	30	--	--	425	1.07
3.	Churachandpur	385	80	40	--	--	505	1.28
4.	Chandel	350	75	35	--	--	460	1.16
5.	Ukhrul	385	80	50	--	--	515	1.30
Total Hill		2,030	490	236	--	--	2,756	6.96

Source: Statistical Abstract of Manipur, 2001, Directorate of Economics and Statistics, Govt. of Manipur.

The amount of chemical fertilizer's consumption is very low in the hill district. Only about 7 per cent of the total amount of states fertilizer's consumption are in hill district while remaining about 93 percent are used in valley districts. Senapati district, with 2.15 per cent of the total states consumption, is the biggest chemical fertilizer consumer among the hill districts. Other districts have less than 2 percent but more than 1 percent each of the total consumption of the state (Table 3.8).

This shows that there is no need of any use of chemical fertilizers in *jhum* cultivation for regaining soil fertility. Lost soil in the *jhum* cultivation automatically gains fertility during the abandoned

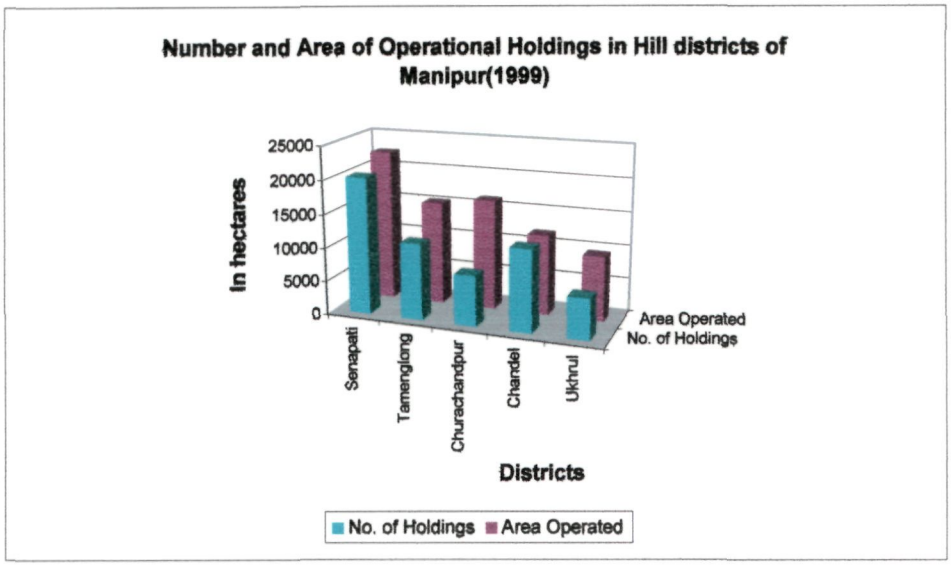


Fig. No. 3.7

Source: Statistical Handbook of Manipur, 1999, Directorate of Economics and Statistics, Manipur

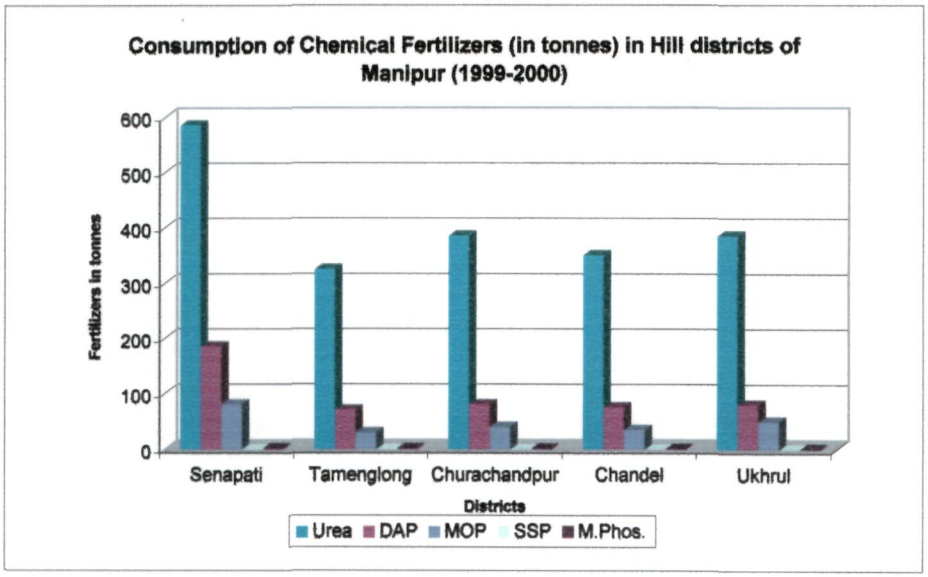


Fig. No. 3.8

Source: Statistical Abstract of Manipur (2001), Directorate of Economics and Statistics, Govt. of Manipur

period. Thus, low production and low inputs characterize *jhum* cultivation.

3.2: Historical Background of Shifting Cultivation or *Jhuming*:

It is known through archaeological discoveries that by about 1,000 B.C. man's attitude to his environment underwent fundamental changes. It may be by accident that he took to hoe from bow, i.e. from hunter he became food producer. The effects of the productive economy as against food gathering economy of the Old Stone Age upon human societies were so impressive that they stand out to us as revolutionary innovations (Childe, 1956). This had enabled prehistoric Stone Age communities to exercise control over his food supply. Man began to plant, cultivate and improve species of edible plants by selection (Sharma, 1990).

It is a matter of concern to delineate, if possible by archaeological methods the techniques of food production in the prehistoric times and to examine how some of these techniques stand in the live of ancestry of some of the methods of cultivation of the modern times. Authorities are of opinion that prehistoric man before they acquired the knowledge and experience to grow plant, experimented in improving the growth of wild species by tending the seedlings. They gathered the grains of the wild species thus tended and used them to supplement their animal food collected by hunting. Archaeologists have shown that the Natufians - a Mesolithic or middle

Stone Age community of former Palestine were the people of this transitional stage (Sharma, 1990).

In the next stage man experiment in growing plant by sowing seeds. From the distribution of prehistoric sites of the early food producers, it is evident that the Neolithic farmers were hill or highland dwellers. They cleared a patch of *jungle* on the hill slopes by cutting the trees, grasses and creepers with the help of the stone axes and then setting them on fire. They had no implement to till the soil as we do in case of plough cultivation. They used a dibble or a digging stick, which is a pointed tool made of wood or bamboo and is used for making holes in the ground for planting seeds in the cleared hill slopes. When the seeds germinate, weeds also grow along with the seedlings. Further, every shower of rain would wash away the loose soil from the hill slopes thus exposing the roots of the seedlings. The removal of weeds and covering the exposed roots of the seedlings is the main agricultural occupation of the highland cultivators. For these purposes, they used stone or wooden hoe or bamboo scrapers. In all the prehistoric sites occupied by the early farmers, large number of stone implements were obtained like axe, adze or hoe blades. The hoe blade is generally hafted to a crooked bamboo haft by mounting the blade perpendicularly to the long axis of the haft. The survival of wooden hoe and bamboo scrappers are very rare in prehistoric sites. But the prevalence of these agricultural tools is known by the primitive farmers of the present day (Sharma, 1990).

It is therefore clear that we can trace back the history of shifting cultivation to about 9,000 years from the present. It is also a matter of great interest that age old prehistoric methods and techniques of food-production is still valid as the principal mode of subsistence farming among the tribals.

Despite the fact that history of Manipur starts with *'Pakhangba'* the first mythological king of Manipur who was the direct son of Supreme God (*Sidaba Mapu*) (according to *Meetei or Meitei* mythology) in 33 A.D., the recent findings of research and excavations at certain places of Manipur reveals that Manipur has been populated since prehistoric times. The first evidence of Paleolithic culture dating back about 30,000 to 40,000 B.C. was discovered by T.C. Sharma (Prof. of Geology, Gauhati University) and O. Kumar (Suptt. of State Archaeology Deptt., Manipur) (Laiba,1988).

Some prehistoric sites in Manipur are the caves like Songbu in Chandel district (about 40,000 B.C.), Khangkhui (30,000 B.C.) and Hundung of Ukhrul district, Tharon of Tamenglong district and the open air sites at Machi in Chandel district, *Nongpok Keithelmanbi* in Senapati district, *Napaching* at Wangu in Bishnupur district, *Panjao Pallum Ching* at Kakching in Thoubal district etc.

According to State Archaeological Department, the prehistoric or Stone Age culture of Manipur is divided into three - (i) Paleolithic culture (ii) Haobinhian culture and (iii) Neolithic culture. The Palaeolithic culture is found in Songbu cave, Khangkhui cave and open

air sites at Machi and Nongpok Keithelmanbi. Number of choppers and chopping tools made on pebbles and bone tools consisting of arrow points, blade etc. is found. It shows that hunting and food collection from *jungle* were the main activities of the people in that period. This culture may be dated back to a time period between 40,000 B.C. to 10,000 B.C. There was no sign of any kind of agriculture during that period. After that the Haobinhian culture came and is found in both the open air sites at Nongpok Keithelmanbi and Tharon cave sites. In this culture period, stone tools were found. Some tools related with food producing were also found like technique of grinding for effective producing. Upto this Haobinhian culture, the people are mainly hill dwellers. Then, Neolithic culture is found both in hills and valley of Manipur. The Napaching Neolithic culture at Wangoo is represented by the fully ground stone tools, arrow points and pottery consisting of tripod corded ware and spindle whorl.

Thus, it is proved that the first settlement of the prehistoric men was at the southern side of Manipur on the top of hill (i.e., Songbu cave near Chingnunghut in Chandel district, around 40,000 B.C.). Then they migrated towards the north. Moreover, after the Paleolithic culture, there was Neolithic culture in the valley around 2000 B.C.

Thus, the history of *Jhum* in Manipur is as old as the history of shifting cultivation in the world. In the Haobinhian culture period which is around between 10,000 B.C. to 20,000 B.C., agriculture related tools were found in the hills through excavation and this shows

simply that they were primitive type of food producers of the hills of Manipur. The system is still continuing with little changes. Same methodology is practised in the remote areas of Manipur hills. Although they are exposed to the forces and influences of advanced civilization with all its lures and attraction for about two hundred years, their main agricultural pattern has not changed, the only difference is that the stone implements of the prehistoric shifting cultivation have been replaced by iron tools. Some of the *Kuki* tribes of Manipur are reported to have been using stone hoes till the middle of the last century.

3.3: Distribution and Nature of Shifting Cultivation or *Jhuming*:

As the pressure of population increased, the hunter-cum-cultivators of the Neolithic period started clearing more patches in forests to bring them under cultivation. At the depletion of fertility, the cultivator used to migrate to new tracts to burn and clear forests for sowing of crops. This type of cultivation is termed as 'slash and burn agriculture' or 'shifting cultivation' or 'bush fallow agriculture' or 'swidden agriculture' in English.

Shifting cultivation is called by different names in different parts of the world. It is variously termed as *Ladang* in Indonesia, *Caingin* in Phillipines, *Milpa* in Central America and Mexico, *Ray* in Vietnam, *Conuco* in Venezuela, *Roca* in Brazil, *Masole* in the Congo and Central Africa. It is also practised in highland areas of Manchuria, Korea and South West China. In North-east India it is known as '*Jhum*' or '*Jum*', in

Orissa as *Podu, Dabi, Koman* or *Bringa*, in Western Ghats as *Kumari*, in Rajasthan as *Watra*, in Madhya Pradesh as *Penda, Bewar* or *Dahia* and *Deppa* or *Kumari* in the Baster district of Chhatisgarh.

'Shifting cultivation implies an aimless, unplanned, nomadic movement or an abrupt change in location, either of which may refer to the cropping areas, the agriculturists, or both. Aside from being ambiguous and in many cases inaccurate, these implications do not focus attention on the two most widely shared characteristics of these various systems; firing and following' (Conklin, 1957).

However, making in more precise in a recent minimal definition, Conklin (1961) described shifting cultivation as 'any agricultural system in which fields are cleared by firing and are cropped discontinuously'.

Shifting field agriculture may be defined as 'an agricultural system which is characterized by a rotation of fields rather than crops, by short period of cropping (one to three years) alternating with long fallow periods (upto twenty and more years, but often as short as six to eight years) and by clearing by means of slash and burn' (Feizer, 1958).

It may be defined as 'the custom of cultivating clearing scattered in the reservoir of natural vegetation (forest or grass woodlands) and of abandoning them as soon as the soil is exhausted and this includes in certain areas the custom of shifting homesteads in order to follow the cultivators search for new fertile land (FAO Paper, 1957).

Shifting cultivation has been described as an economy of which the main characteristics are rotation of fields rather than crops, absence of draught animals and manuring, use of human labour only, employment of dibble stick or hoe, short period of occupancy alternating with long fallow periods. After two or three years the fields are abandoned, the cultivators shift to another clearing, leaving the old one for natural recuperation. This explains the use of the term 'shifting cultivation'. It however, does not imply that the homesteads are also shifted to the new site along with the shifting cultivation. More often than not, the homestead are not shifted. (Hussain, 1979).

Shifting cultivation locally known *jhuming* in Manipur represents the first endeavour of people to control static resources, that is, the bounty of the land. Agriculture, more than any of the economic activities are largely influenced by the natural environment and technological innovation and application of capital and energy. *Jhuming* is called primitive because it manifests only rudimentary technical management of the land, and limited amounts of time, effort and capital are devoted to this activity.

In fact, the technology applied in sowing and planting *jhum* are rudimentary. *Jhum* is done in the hilly, hot and humid sites, where *jhumias* confronted with the problem of clearing land from either dense forests or overgrown grasses. Trees and undergrowth are cut down and for this *jhumias* used *Dao* (machetes) and the dried vegetation is burned. Methods of preparing the field for sowing are primitive. By

using a digging stick (dibble) or a hoe, *jhumias* scratch the surface of the soil for sowing and planting purpose. No other attempts have been made to prepare the soil. Ploughing of field is unknown in *jhum*.

The mountainous topography, undulating slopes surrounding the Manipur valley and wet weather for over seven months (April to October) provide conditions in which people are practising shifting cultivation. The people who are scattered over the hills depend for their sustenance or shifting cultivation and food gathering from the forest.

In the hills of Manipur, where the density of population is so less - only about 49 persons per sq.km. as against the density of 628 persons per sq. km. in the Central Valley districts, the hill man has to face the difficulties of steep slope, poor soils, and mosquito infested and less invigorating climate, poor means of communication and a life of isolation and relative isolation. Under such an adverse physico-socio-cultural environment his life is that of a desperate struggle for survival. As a result, he is compelled to adopt a primitive mode of cultivation on the undulating slopes of the surrounding hills of Manipur.

The Tribal Benchmark Surveys (1980) have reported the percentage of households engaged in shifting cultivation either fully or partly in the sub-divisional levels in each of the five hill districts in Manipur.

Table 3.9: Percentage of Households Engaged in Shifting Cultivation, Partly shifting and Partly Permanent Cultivation, and Permanent Cultivation in the Hill Districts of Manipur (1980)*.

S. No.	District	Sub-Division	Cultivation		
			Shifting	Partly Shifting	Partly Permanent
1.	Churachandpur	Churachandpur (rural)	17.3	16.8	26.7
		Thanlon	77.7	17.3	0.2
		Henglep	55.3	7.8	5.6
		Tipaimukh	87.2	4.2	4.8
		Singhat	67.7	21.5	8.3
Total			**61.04**	**13.52**	**9.12**
2.	Senapati	Mao-Maram(rural)	12.2	28.6	57.9
		Saikul	45.1	28:8	22.6
		Kangpokpi (rural)	25.3	34.3	36.5
		Mao-Maram (urban)	62.8	7.7	4.5
		Mao-Maram Mao ST	33.5	15.6	49.3
Total			**35.78**	**23.00**	**34.16**
3.	Tengnoupal	Chandel	36.7	23.3	31.5
		Tengnonpal(rural)	52.4	12.2	28.5
		Chakpikarong	36.3	38.9	22.2
		Tengnonpal(urban)	--	81.00	21.00
Total			**31.35**	**38.85**	**25.8**
4.	Tamenglong	Nungba	67.7	7.8	24.3
		Tamenglong West(rural)	81.1	--	17.8
		Tamenglong (rural)	81.5	--	16.1
		Tamenglong (North)	42.7	3.5	47.1
		Tamenglong (urban)	27.7	--	35.9
Total			**60.14**	**2.26**	**28.24**
5.	Ukhrul	Ukhrul Central (rural)	13.7	18.0	68.4
		Kamjong	88.0	1.9	3.9
		Phungyar	45.8	29.0	24.8
		Chingai	14.3	6.2	79.3
		Kasom Khullen	80.6	4.9	11.7
		Ukhrul (urban)	4.0	4.0	81.8
Total			**41.06**	**10.67**	**44.98**
Total Hill Districts			**45.87**	**17.66**	**28.46**

Note: * 1980 data was available.

Source: Tribal Benchmark Survey of the Five Hill Districts of Manipur (1980).

A perusal of table 3.9 shows that in the hill districts nearly 46 percent of the total household is under shifting cultivation, 18 percent is under partly shifting and partly permanent cultivation and 28 percent is under permanent cultivation. Churachandpur district has the maximum households i.e., 61 percent under shifting cultivation followed by Tamenglong district (60.4 percent), Ukhrul district (41.06

percent), Senapati district (35.78 percent) and Tengnoupal district (31.35 percent).

In Churachandpur district the number of households practising shifting cultivation and partly shifting and partly permanent cultivation in the five-subdivisions - Churahcandpur (Rural), Thanlon, Henglep, Tipaimukh and Singhat is much higher than that of the households engaged in permanent cultivation due to hilly nature of the terrain. About 87.2 percent of the total household of Tipaimukh subdivision is under shifting cultivation while only about 4.8 percent is under permanent cultivation. Churachandpur (rural) subdivision has an exceptional figure with 26.7 percent of the total households under permanent cultivation due to the availability of valley or flat land to practise permanent cultivation, 16.8 percent is under partly shifting and partly permanent cultivation while about 17.3 percent is under shifting cultivation.

In Senapati district, Mao-Maram (rural), Kangpokpi (rural) and in Mao-Maram Mao ST. subdivisions, the percentage of households engaged in shifting and partly shifting and partly permanent cultivations is less than that of the households engaged in permanent cultivation. In Saikul and Mao-Maram (urban) subdivisions the percentage of households engaged in shifting cultivation and partly shifting and partly permanent cultivation is much higher than the percentage of permanent cultivation due to its hilly nature and primitive life style of the people.

In Tengnoupal district, Chandel (rural), Tengnoupal (rural) and Chakpikarong (rural) have higher percentage of households engaged in shifting cultivation and partly shifting and partly permanent cultivation than the percentage of households engaged in permanent cultivation. In Tengnoupal (urban) subdivision, the figures of households engaged in shifting cultivation is not available in the Benchmark Survey Report. But those engaged in partly shifting and partly permanent cultivation is much higher than permanent cultivation. Influence of hilly terrain and primitive life style is high in practising *jhum*.

In Tamenglong district, Nungba, Tamenglong west (rural), Tamenglong (rural) subdivision has a much higher percentages of families involved in shifting cultivation and partly shifting and partly permanent cultivation than permanent cultivation while in other remaining two subdivision-Tamenglong North and Tamenglong (urban), the percentage of permanent cultivation is higher than the percentage of shifting cultivation and partly shifting and partly permanent cultivation. Terracing on hilly slopes for permanent cultivation is practised in these two subdivisions at high rate. *Jhum* areas are transforming into terraced field. Thus, percentage of families involved in permanent cultivation is high.

In Ukhrul district, the percentage of households practising shifting cultivation and partly shifting and partly permanent cultivation is overwhelming. In Kamjong, Phungyar and Kasom-Khullen subdivisions it is 88.0 percent, 45.8 percent and 80.6 percent

respectively. The percentage of permanent cultivation is much higher in Ukhrul Central (rural), Chingai and Ukhrul urban subdivision than the percentages of other categories with availability of permanent cultivation such as terraced cultivation.

There has been no cadastral survey in the hills of Manipur. Hence, it is not possible to give the exact total area under shifting cultivation in the hills. The Department of Horticulture and Soil Conservation, Government of Manipur has estimated an annual area of 70,000 hectares plus 2,000 hectares (considering the annual increases of about 3% in population) under shifting cultivation. This estimate was not based on Cadastral Survey, but was only a rough estimate on the basis of the Tribal Benchmark Survey population in the Census Report, 1981. No latest information and data are available regarding the subdivisional-wise area under shifting cultivation and others.

In general, the land around the village in the hills of Manipur within certain fixed bounds is usually the property of the village. In the midst of sharp relief and gentle slopes, if available, land is used for terracing, in the absence of which, the land is put to *jhuming.* According to the prevailing customs, all land adjoining the village belongs to the community or the head of the village and exclusive right of an individual is not accepted. The operation of *jhum* is initiated with the selection of *jhum* site, which is done by the village headman or priest in advance and individual families are allotted their share. In selecting the *jhum* site, the fertility of soil is taken into consideration

by observing the texture, colour and depth of soil with naked eyes of the experienced *jhumias*. In some tribes, community as a whole are collectively responsible for the clearing of the selected piece of land while in others the cutting of trees and shrubs is made by the individual family to whom the land has been allotted. In the months of November and December slashing of trees starts. Hundreds of trees are to be cut down to clean the land with *dao* and axe. After felling the forests, the wood and twigs are allowed to dry, so that it may be fired in the month of March when the weather is sunny and overcast skies are rare. In burning down the dried vegetation, utmost care is taken to stop the spread of fire in the surrounding virgin forests, otherwise the uncontrolled fire, in many cases, spreads beyond the *jhum* area and does great damage to the surrounding valuable forests. The soil for a depth of one or two inches gets completely burnt. The soil is, thereafter, scratched up with little hoe and in this process the soil and the ash get mixed up together. Thus, the land is prepared for sowing of crops.

On the day of sowing, which is a ceremonial day for the whole village, the male members of each family on reaching the *jhum* field in the early morning engage themselves in preparing the digging sticks. The seeds of crops like millets and small millets are sown by male members through broadcast while female do the work of dibbling and planting the seeds of crops like maize, pulses, cotton, sesamum and vegetables. While dibbling the seeds, the female walk over the field with digging stick or billhook in hand, make a hole in the ground, sow

a few seeds and cover it with earth by pressing it down with her toe. (Hussain, 1979). Thus, in *jhum*, soil is never ploughed and no irrigation is made. After the sowing stage is over, *jhumias* pay special attention to the growing crops and to remove the weeds in the field. After sowing *jhumias* fence the field with bamboo and construct a hut in the field to protect it from stray cattle and wild animals and to look after the crops.

Harvesting of crops is done in different periods according to the type of crops grown. Main crops such as maize, rice millets, pulses and oilseeds are harvested in September and October. The harvested crops are collected and stored in a big barns after dehusking. When the harvest operations are over, people are free from the routine work of agriculture and they make merry. It is a time for feasts, marriages and festivals etc.

In the field, *jhumias* try to lessen the rate of soil erosion by traditional methods. There is traditional problem of soil creep and landslide, which is more frequent in Manipur north, Manipur west and Manipur south districts. In the course of two or three years the land gets devoid of soil and becomes unfit for cultivation.

In most of the fields mixed cropping is practised. While in some villages like the Tangkhul village, there is only one crop i.e., rice in the *jhum* field and the field is left after one year of cropping. The mixture of crops varies from tribe to tribe and from region to region owing to the prevailing conditions. The *jhumias* grow cereals,

vegetables and cash-crops mixed with each other based on the needs of his family. Among the food grains the coarse varieties of rice, followed by maize, millets, job's tears and small millets are the principal crops grown. Cotton, ginger, linseed, rape-seed, sesamum, pineapple and jute are the other crops grown in *jhum* fields. Among the vegetables, soya-beans, pumpkins, potato, cucumbers, yarns, tapioca, chillies, beans, onion, arum are cultivated. Thus, in the mixed cropping soil exhausting crops like rice, maize, millets, cotton etc., and soil enriching crops like legumes are sown together. This practice has many direct and indirect advantages from the point of soil fertility and conserving of soil. These crops are harvested at different periods, thereby providing the tribes with varied food for nearly six to eight months in a year. The same *jhum* land is cropped by the communities for one to three years, thereafter, the land is abandoned to recuperate.

At present, with the increase of population, the *jhum* cycle has reduced at an alarming rate in Manipur. The *jhumias* have not got much choice left but to shift about. He moves within a circle and the circle becomes smaller and smaller. In earlier times, the period in which the *jhumias* returned to cultivate the same plot was quite long. Nowadays in Manipur the abandoned *jhum* land remains fallow for a period of three to eight years (15 years jhum cycle is also available). During, the fallow period, grasses, reed, bamboo, pines and numerous trees and bushes grow on the slope.

Almost all the tribes living in the hills of Manipur are involved in *jhum*. It is, however, more prevalent in the case of *Thado* in Manipur East district. The other dominant tribes are *Purum*, *Koireng-chothe* in Tengnoupal district, *Hmar Gangte*, *Ralte* and *Paite* in Manipur North district, *Chiruchothe*, *Hmar* and *Kaccha Naga* in Manipur West district. The *Kabuis* of Manipur west district and *Maring* of Tengnoupal district practise *jhum* with some modification. However, the *Kabuis* around the Khoupum valley have taken to plough cultivation in the alluvial plains. These *jhumias* of Manipur are quite conscious of the much labourious and wasteful method of cultivation of crops. But they are traditionally bound and *jhum* is a way of life. Thus, they don't see any alternative of sustenance in the near future. Terracing of gentle slope is not applicable in all the situations in any village. If *jhumias* are completely prevented from practising *jhum* they face the threat of starvation.

PART - II

CASE STUDY : UKHRUL DISTRICT

CHAPTER – IV

J HUM CULTIVATION IN UKHRUL DISTRICT

Ukhrul district (94.0' to 94.45' East longitudes and 24.15' to 24.45' North latitudes) is the easternmost district of Manipur. The district is located at an elevation ranging between 388 and 2834 metres above mean sea level. It is bounded by the Imphal district on the south, Nagaland on the north, Senapati district on the west and Myanmar on the east. The total area of the district is 4,544 sq. km. and population is 140,946 (Census of India, 2001). Being a rural district mostly the population is rural in character. The district headquarter is located at Ukhrul (Fig. 4.1).

The district is divided into three hilly regions namely, the northern hilly region, the eastern hilly region and the southern hilly region.

The northern hilly region spreads over the north-western parts and covers more than half of Ukhrul central sub-division. This region has three hill ranges. The maximum height is 2,568 metres above mean sea level near Langdung village and the minimum height is 1,155 metres above mean sea level near Kharasom and Khunbi village. This region is drained by the Chamu, Regonga, Akhong Lok and Thoubal rivers.

The eastern hilly region spreads over the eastern parts and makes its boundary with the state of Nagaland in the north, Myanmar in the east, Chandel district in the south and northern and southern hilly regions in the west. The region has one hill range. The maximum height is 2,834 metres above mean sea level near Khamasom village

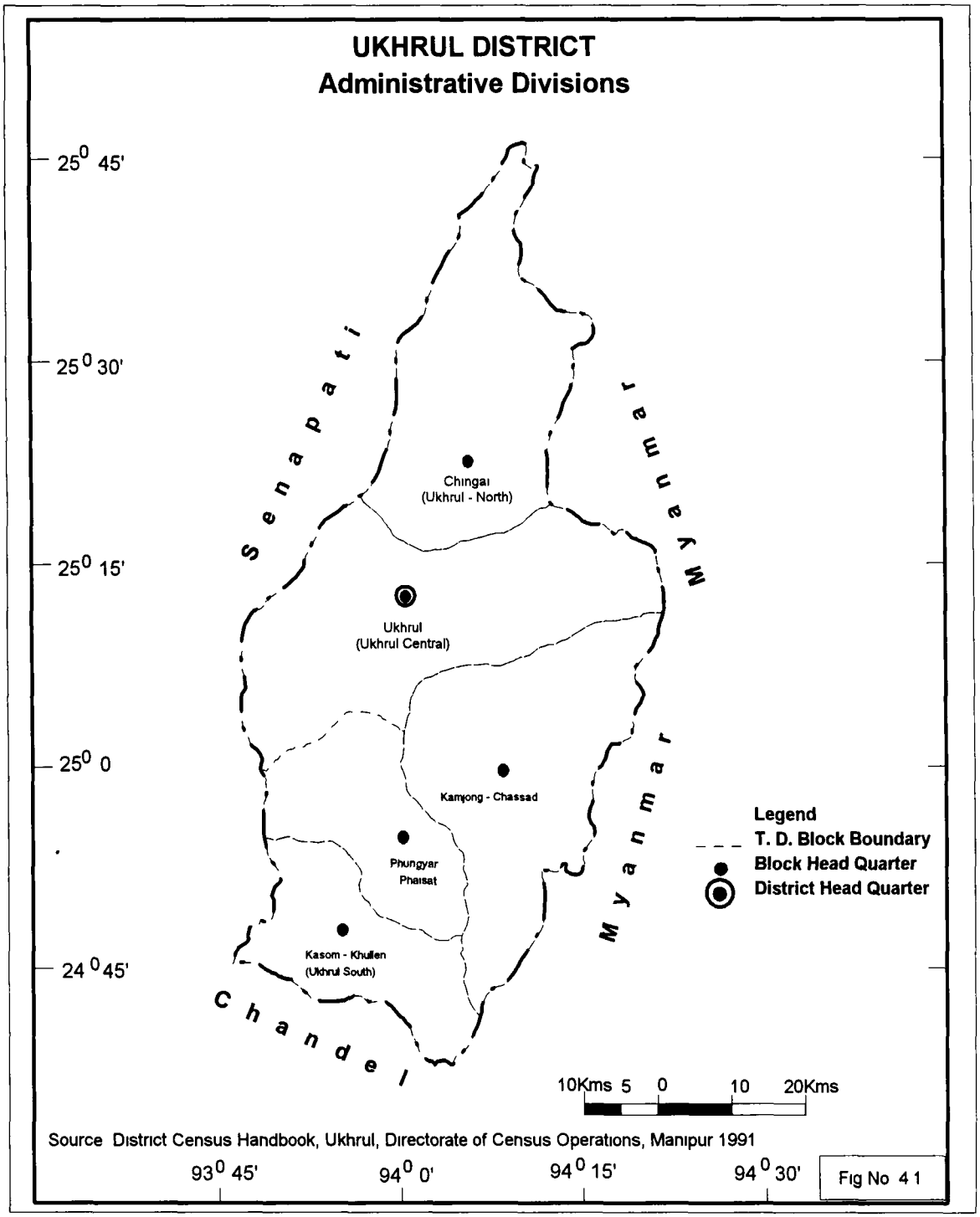
and the minimum height is 453 metres above mean sea level near Chalong Khunou village. The region is drained by Chamu, Maklang and Tuyungbi rivers.

The southern hilly region extends over the south western parts occupying more than half of the Ukhrul south sub-division, part of Kamjong-Chassad sub-division and whole of Phungyar-Phaisat sub-division. The region makes its boundaries with Senapati district and Imphal district in the west and Chandel district in the south and eastern hilly region in the east. The region has five hill ranges.

The whole district is having monsoon type of climate. It receives heavy rainfall. The district is rich in forest resources like tropical hardwood, timber, superior varieties of bamboos, cane etc. About 61 per cent of total area is under forest (1993-94).

Ukhrul district is a land of beautiful mountains interspersed by numerous tribal habitats. The most predominant tribal community is the *Tangkhul Nagas* followed by *Thadou* tribes. The *Thadous* are the major sub-clans of *Kuki* tribes. The *Tangkhuls* belong to the sub-Himalayan or Neo-Tibetan tribes and they are the earliest tribes inhabiting this districts.

The district is further sub-divided into five development blocks namely, Chingai, Ukhrul, Phungyar-Phaisat, Kamjong and Kasom Khullen, spread over 222 villages. Ukhrul contains 64 villages, followed by Kamjong (49), Phungyar-Phaisat (44), Kasom-Khullen (34) and Chingai (31) (fig. 4.1).


UKHRUL DISTRICT
Administrative Divisions
25⁰ 45'
25⁰ 30'
25⁰ 15'
25⁰ 0
24⁰45'
Senapati
Myanmar
Myanmar
Chandel
Chingai
(Ukhrul - North)
Ukhrul
(Ukhrul Central)
Kamjong - Chassad
Phungyar
Phaisat
Kasom - Khullen
(Ukhrul South)
Legend
T. D. Block Boundary
Block Head Quarter
District Head Quarter
10Kms 5 0 10 20Kms
Source District Census Handbook, Ukhrul, Directorate of Census Operations, Manipur 1991
93⁰ 45'
94⁰ 0'
94⁰ 15'
94⁰ 30'
Fig No 4 1

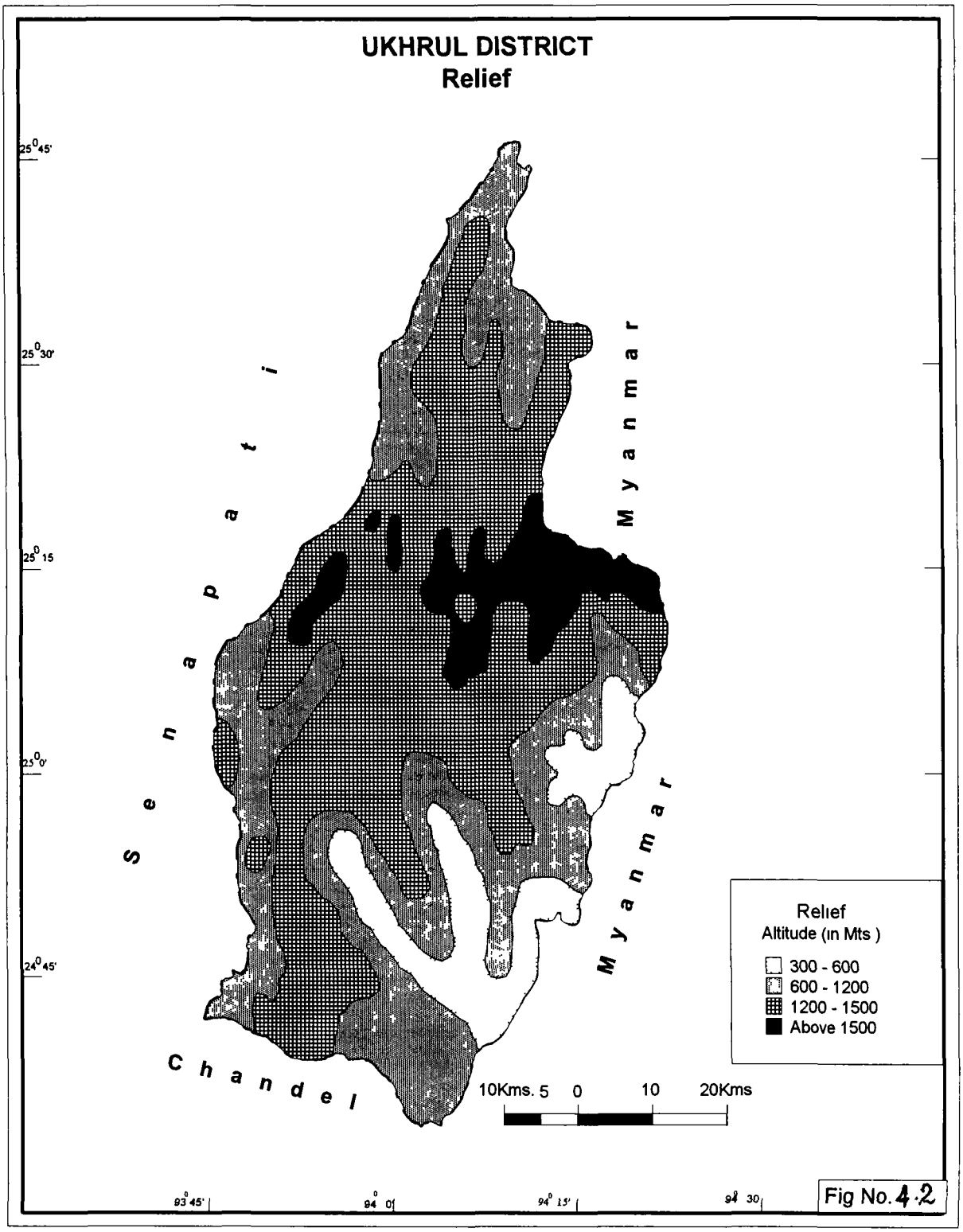
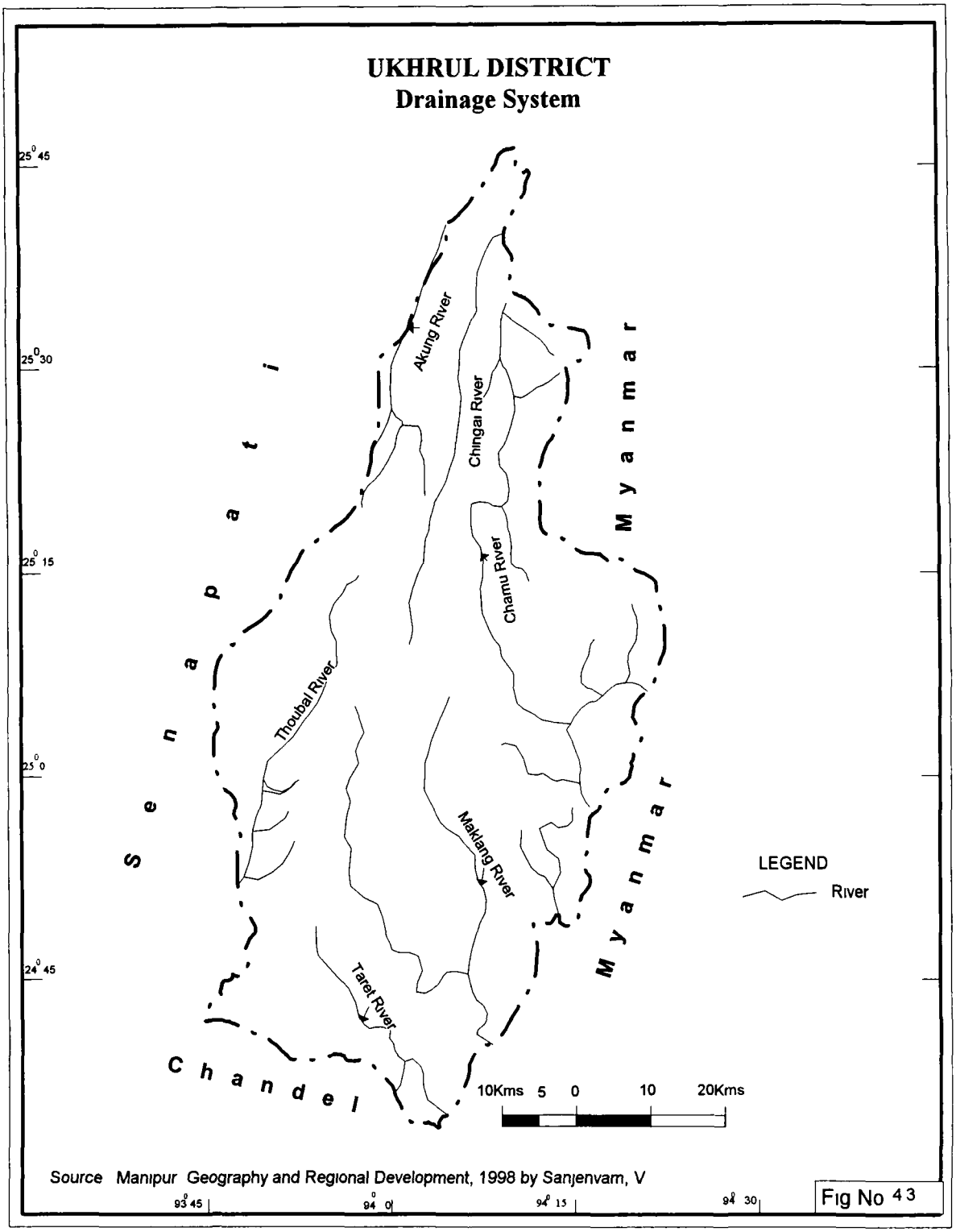
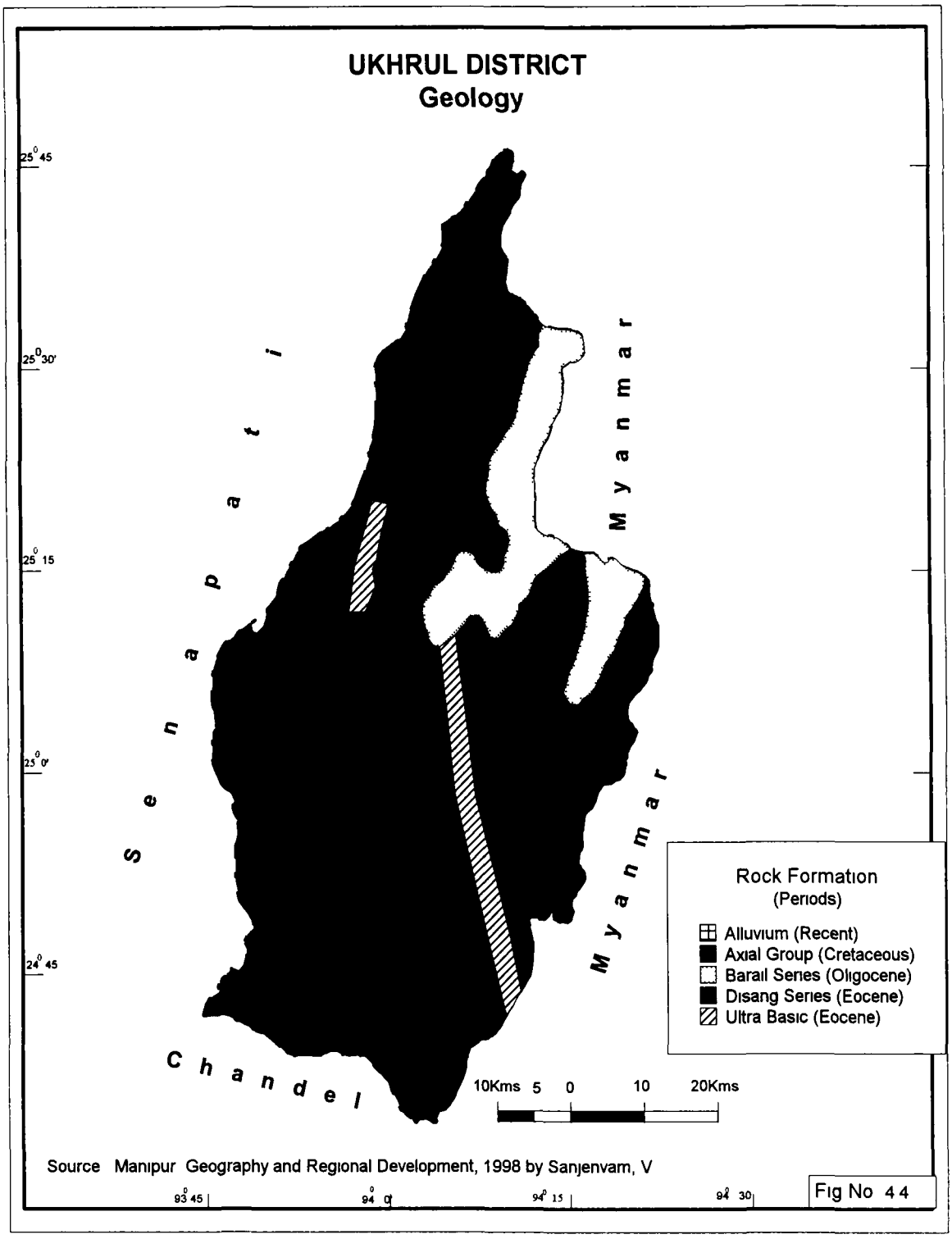

UKHRUL DISTRICT
Relief
25°45'
25°30'
25°15
25°0'
24°45'
Senapati
Myanmar
Myanmar
Chandel
Relief
Altitude (in Mts)
300 - 600
600 - 1200
1200 - 1500
Above 1500
10Kms. 5 0 10 20Kms
93°45'
94° 0'
94° 15'
94° 30'

Fig No. 4.2



Source Manipur Geography and Regional Development, 1998 by Sanjenvam, V

Fig No 43


UKHRUL DISTRICT
Geology
25° 45
25° 30'
25° 15
25° 0'
24° 45
Senapati
Myanmar
Myanmar
Chandel
Rock Formation
(Periods)
Alluvium (Recent)
Axial Group (Cretaceous)
Barail Series (Oligocene)
Disang Series (Eocene)
Ultra Basic (Eocene)
10Kms 5 0 10 20Kms
93° 45
94° 0'
94° 15
94° 30
Source Manipur Geography and Regional Development, 1998 by Sanjenvam, V
Fig No 44

Majority of the population is dependent on agriculture. Due to the hilly nature of the terrain and tribal population, *jhum* or shifting cultivation is practised. The agricultural season and operation varies from place to place. But in general, land is cleared in January and February, crops are sown in May and June and harvesting starts in October and ends in the early part of December.

Though the operation and practise of *jhum* may differ from village to village in Ukhrul district, the methodology and nature are same with rudimentary techniques of land management. Stages of *jhum* are also similar to other districts of Manipur (which was discussed in chapter III). Practising *jhum* in the district has a disastrous impact on the ecology of the area. The burning of forests or grasses results in loss of precious biomass and release of many harmful gases. The loss of forest cover results in land degradation and increase in the sediment load of rivers etc.

Recent figures are not available as far as the area under *jhuming* in Ukhrul district is concerned. However, Manipur Remote Sensing Application Centre, Imphal provided data on *jhum* in Ukhrul district after analysing satellite imagery which was taken during 1986-87 and 1993-94. In 1986-87, the total area under *jhum* was 99,162 hectares covering about 21.82 per cent of the total area of Ukhrul district. Out of this, only 14,231 hectares was under current *jhum* which is 3.13 per cent of the total district. Another 20,781 hectares and 64,150 hectares were under one to five years and five and above years abandoned *jhum*

which was 4.57 per cent and 14.12 per cent of the total area of the district. In 1993-94, area under *jhum* was 35.77 per cent of the total district. *Jhum* extends to 162,547 hectares in hill slopes, though the area under current *jhum* declined from 14,231 hectares in 1986-87 to only 8,460 hectares in 1993-94 which is about 1.86 per cent of the total area. One to five years abandoned *jhum* covered 6.40 per cent and five and above years abandoned *jhum* covered 27.5 per cent of the total area of the district in 1993-94.

It was observed that *jhuming* was mainly practised on hill slopes near road sides and near villages. Those people who used to practise *jhum* at far off places from their village sites, they were forced to leave it due to abnormal human environment, mainly continuance of clashes among the hill tribes. This is the reason for the decrease of area under current *jhum* from 1986-87 to 1993-94. Wide hill slopes, adequate rainfall, forests of humid tropics type with sparse population, ownership of land, quality of ecosystem are well suited for this primitive cultivation system. This has helped in the spread and intensity of *jhum* cultivation in this district.

Jhuming cultivation in Ukhrul district, though a rudimentary technique of land and forest resource utilization, represents an intricate relationship between ecology, economy, society and the cultural ethos of the region. The concept of community ownership, community participation and responsibility of community as a whole are the basic of their social organization. The forest and the land are the properties

and assets of the community and each individual has a right to draw on them according to his requirements and capacity to work. In some villages, land belongs to the king or village headman particularly in *Kuki* villages. Village headman is the sole authority of the land and any change of landuse should be under his permission. Generally, there is a system of land occupancy based on his needs and capacity. Thus, in the society of *jhum*, the old, women, widows and children have an equal share, and each member of the society plays a role according to his physical and mental abilities. For example, the selection of site for the *jhum* and religious ceremonies are performed by the elderly and experienced members of the society, while the felling of trees and clearing of *jungles* as well as burning of the dried biomass is the duty of the young and energetic members of the village community.

In this chapter an attempt has been made to study the landuse/land cover for 1986-87 and 1993-94 period on 1:50,000 scale using landsat (TM/IRS) (LISS-II) geocoded imagery corresponding to Survey of India (SOI) topomaps. In addition, area under different landuse/land cover categories and the changes occurring in these categories in the micro-watersheds have been estimated. Slope analysis in the different micro-watersheds has also been done.

4.1: Landuse pattern in Ukhrul district:

Landuse is the utilization of all developed and vacant land on a specific point and at a given time and space. It is controlled by two sets of variables physical and cultural. Physical factors include topography,

climate, soil and vegetation which provides the regional framework and limits the use of capabilities. Cultural factors includes the length of occupance of the area, demographic and socio-economic conditions, institutional framework and the technological level of the people which determines the extent of land utilization. Locational factors also have their influence on land use of a particular area by way of transportation lines and bringing capital and labour to the land.

The study of land use occupies a pivotal place in agricultural planning. Ukhrul district which is entirely in highly and mountainous region has been classified into 6 landuse categories based on the standard classification of landuse/landcover developed by NRSA (National Remote Sensing Agency), Hyderabad. Two time landuse datas of Ukhrul district have been discussed here.

Table 4.1: Landuse/Landcover statistics of Ukhrul district (1986-87 and 1993-94).

S. No.	Category	1986-87		1993-94		Percentage change
		Areas (in ha.)	Per cent to the total area	Areas (in ha.)	Per cent to the total area	
1.	Built-up land	1,709	0.38	1,709	0.38	Same
2.	Fallow (plain)	9,340	2.05	9,340	2.05	Same
3.	Current *Jhum*	14,231	3.13	8,460	1.86	-1.27
	Abandoned *Jhum*					
	→ 1-5 years	20,781	4.57	29,082	6.40	+1.83
	→ 5 and above yrs.	64,150	14.12	125,005	27.51	+13.39
	Total *Jhum*	99,162	21.82	162,547	35.77	+13.95
4.	Forest					

	→ Primary					
	→ Secondary	340,830	75.00	277,445	61.06	-13.94
5.	Water bodies	1,785	0.39	1,785	0.39	Same
6.	Others (Roads)	1,574	0.35	1,574	0.35	Same
	Total	**454,400**	**100.00**	**454,400**	**100.00**	

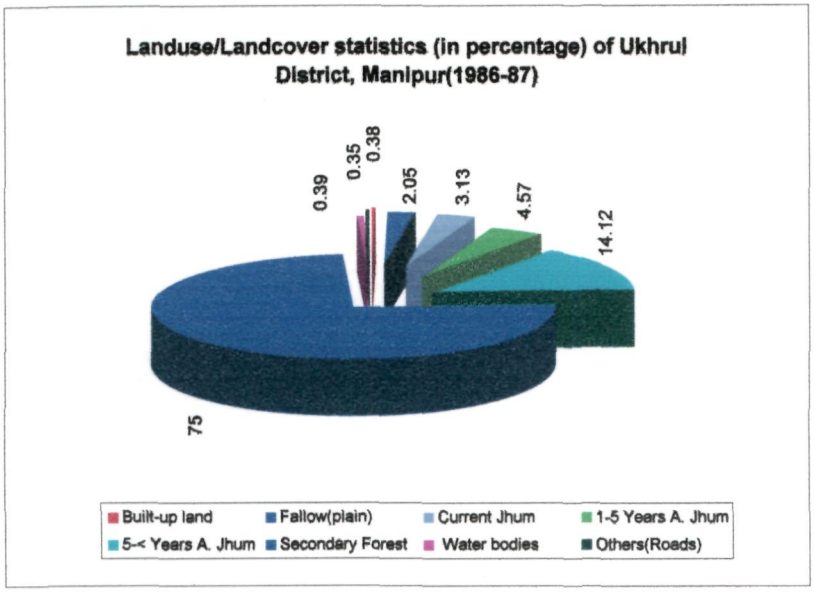
Source: Manipur Remote Sensing Application Centre, Imphal (1995).

A perusal of Table 4.1 shows that from 1986-87 to 1993-94, the built-up area has remained the same. There has been no expansion in the built-up area due to hilly nature of the terrain and other unfavourable environmental conditions. Area under fallow, water bodies and roads are also the same. While an increase of 13.95 per cent is observed in area under *Jhum*. This again shows the favourable conditions are available for *jhuming*. An increase in area under abandoned *jhum* (both for 1-5 years and more than 5 years category) is also observed. While a decrease (-1.27%) in current *jhum* area is seen. Area under forest has also declined (13.94 per cent) in Ukhrul district.

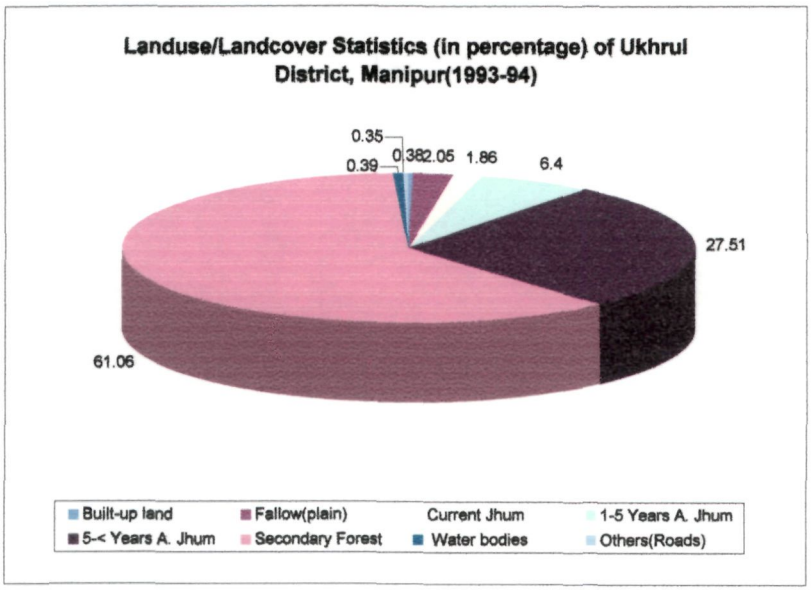
1. Built-up land:

It is defined as an area of human habitation developed due to non-agricultural use. It includes buildings, transport and communication, utilities in association with water, vegetation and vacant lands. The physical size of built-up land (due to sprawl) and the connection by transport network enables to distinguish urban from rural.

LAND USE/LAND COVER STATISTICS OF UKHRUL DISTRICT (1986-87 & 1993-94)



(a)



(b)

Fig. No. 4.5

Source: Manipur Remote Sensing Application Centre, Imphal 1995

An area of 1,709 hectares which is 0.38 per cent of the total land area of Ukhrul district is under this category both in 1986-87 and 1993-94. All these built-up land area comes under the rural category because there is no urban area in Ukhrul district.

2. Agricultural land:

It is defined as the land primarily used for farming and for production of food, fibre and other commercial and horticultural crops. It includes land under crops (irrigated or unirrigated), fallow (plain), plantation etc.

a. Crop Land:

It includes those lands with standing crops. The crops may be of either *kharif* or which is associated with rainfed crops under dry land farming, limited irrigation and abundant rainfed paddy and other dry crops or *rabi* which is associated with area under good irrigation and areas abundant with wheat and other crops. It even includes the areas with standing crops during both the seasons of *kharif* and *rabi.* Usually such areas are associated with double crops.

b. Fallow (plain) land:

It is described as agriculture land which is taken up for cultivation but is temporarily out of cultivation for one or more seasons. Fallow lands in present context are associated only with plains since the study area has maximum area under shifting cultivation. An area of 9,340 hectares which is about 2.05 per cent to the total area of

the district was under fallow land during 1986-87. It remained same during 1993-94.

3. Shifting Cultivation/*Jhum*:

It is a result of cyclic landuse practice of cutting of trees and burning of forest areas for growing crops. It is divided into two heads as current and abandoned *jhum*.

a. Current *Jhum*:

Area under shifting cultivation being used currently for cultivation is categorized as current *jhum* area. This may be of previous year also which was cultivated successively. Fresh burnt areas for *jhum* of current season also came under this category. An area of 14,231 hectares which is about 3.13 per cent to the total area of the district was under current *jhum* in 1986-87 while it decreased to 8,460 hectares which is about 1.86 per cent of the total area of Ukhrul district in 1993-94. Decreasing area of current *jhum* from 1986-87 to 1993-94 is not due to availability of any alternative to *jhum* but due to the result of continuous and wide spread clashes among the tribal communities.

b. Abandoned *jhum*:

Area once under *jhum* cultivation and presently not being used is categorized as abandoned *jhum* area. This area is generally left fallow and subsequently mixed vegetation/scrubs grow here. Such areas are not used for *jhum* practice until the cycle is repeated by tribal families. This category is again divided into sub-categories.

ii. One year to five year abandoned *jhum*:

Jhum areas which are left unused for cultivation and are covered with scrubs/mixed vegetation of less height with less crown canopy are categorized as one year to five years abandoned *jhum*. An area of 20,781 hectares in 1986-87 and 29,082 hectares in 1993-94 which is about 4.57 per cent and 6.40 per cent to the total area of the district respectively comes under this category. An increase in area is observed.

ii. Five years and above abandoned *jhum*:

Areas under *jhum* cultivation five years back and above are covered with mixed vegetation of considerable height. These are the areas mostly affected during cycle of *jhum* practise. In 1986-87, 64,150 hectares or 14.12 per cent and in 1993-94, 125,005 hectares or 27.51 per cent of the total area of district was under this category. An increase is observed.

iv. Forests:

This is classified into primary and secondary forests.

a. Primary forest:

These are potential forest lands whether state owned or private, with dense crown cover, usually places of good wild life and are undisturbed forest areas. There is no good primary forest in the study area and area under this category is negligible.

b. Secondary Forest:

It is an area bearing an association predominantly with trees and other vegetation types capable of producing timber and other forest products. These are areas once under *jhum* cultivation which regained the vegetation like pure bamboo, bamboo mixed with other vegetation etc. with canopy of more than 40%. There is a regenerated forest mostly mixed with few patches of bamboo after *jhum* cultivation. So far, no area of the district is declared under 'Notified Forest'. Most of the areas in the district are covered by this category. Coverage was more in 1987 than in 1994 due to corresponding increase in the category of 5 years to above year abandoned *jhum*.

An area of 340,830 hectares and 277,445 hectares were under the secondary forest category in 1986-87 and 1993-94 respectively. Thus, in 1986-87, secondary forest covered about 75 per cent while in 1993-94, it covered about 61.06 per cent of the total Ukhrul district. Decreasing area under secondary forest (63,385 hectares) within eight years clearly indicates that the quality and quantity of secondary forests is reducing year by year with increasing population and *jhum* cultivation as a way of life which is mostly found in the inhabited and road side area in the district.

Forest classification is based on many criteria such as by legal status, by ownership, by composition, by types etc. Forest classificaiton of the district by legal status in recent years are not available perhaps due to non-existence of reserved forest in the district.

Another classificatiion of forest in Ukhrul district was made by Manipur Remote Sensing Application centre, Imphal in 1990. (table 4.2).

Table 4.2: Forest cover in Ukhrul District (1990)

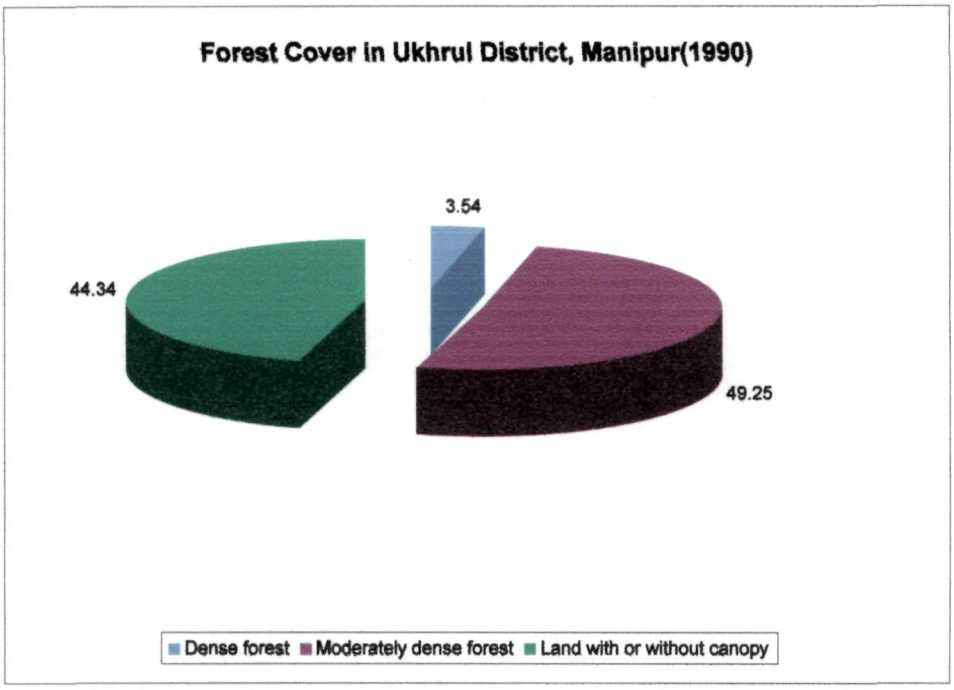
S. No.	Category	Area (in hectare)	Per cent to the total district
1.	Dense forest (Canopy cover above 40%)	16,079.30	3.54
2.	Moderately dense forest (Canopy over 20%-40%)	223,792.18	49.25
3.	Land with or without scrub (Canopy cover below 20%)	201,483.12	44.34

Source: Manipur Remote Sensing Application Centre, Imphal (1990).

From table 4.2, it is seen that the forests of Ukhrul district are put under three heads as dense forest, moderately dense forest and land with or without scrubs.

Dense forest occurs in the eastern part of Ukhrul sub-division and Awang Kasom. These are found on hill slopes and piedmont zones. Dense forests can be observed over 16,079.30 hectares which is 3.54 per cent of the total area of Ukhrul district. Moderately dense forest mainly occurred at Chingai sub-division and most part of the Ukhrul district. The total area under this category is estimated to be 223,792.18 hectares which is roughly 49 per cent of the total area of the district. Most of the district is covered by this class of forest. Land with or without scrub covered an area of 201,483.12 hectares which is about 44.34 per cent of the district. Ukhrul and Kamjong sub-division are mainly covered with this category of forest.

FOREST IN UKHRUL DISTRICT



(a)

Source: Manipur Remote Sensing Application Centre, Imphal 1990

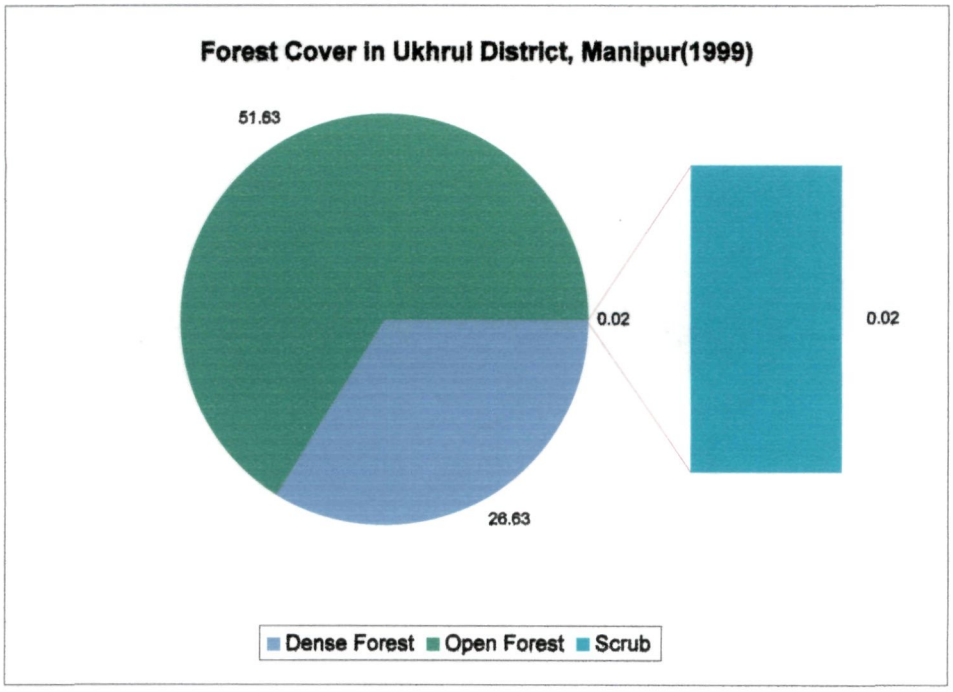


Fig. 4.6 (b)

Source: State of Forest Report, 1999, Forest Survey of India, Dehradun

Moreover, another type of forest category was made by Forest Survey of India, Dehradun in 1999.

Table 4.3: Forest Cover in Ukhrul district (1999)

S. No.	Category	Area (in Sq.km)	%age to the total area	Changed compared to 1997 assessment
1.	Geographical area	4,544	100.00	0
2.	Dense forest	1,210	26.63	-4.09
3.	Open forest	2,346	51.63	-11.49
4.	Scrub	1	0.02	-0.38
Total Forest		**3557**	**78.28**	**-15.96**

Source: State of Forest Report (1999), Forest Survey of India, Dehradun.

Thus, in 1999, dense forest covered only 26.63 per cent while 51.63 per cent was under open forests. A comparison of 1997 and 1999 data shows a decrease of 4.09 per cent of dense forest, 11.49 per cent of open forest and 0.38 per cent in area under scrubs. A total decrease of 15.96 per cent in the area under forest cover in Ukhrul district was observed.

5. Water Bodies:

Rivers/streams like Thoubal, Iril, Chamu, Chingai, Yu, Maklang and Tuyungbi etc, are flowing across the Ukhrul district. A total of 1,785 hectares which is about 0.39 per cent of the total area of Ukhrul district was estimated to be under water bodies.

6. Others:

It includes all those land, which can be treated as miscellaneous because of their nature of occurrence, physical appearance and other

characteristics. A total area of 1,574 hectares was under this category which is 0.35 per cent of the total Ukhrul district in both years.

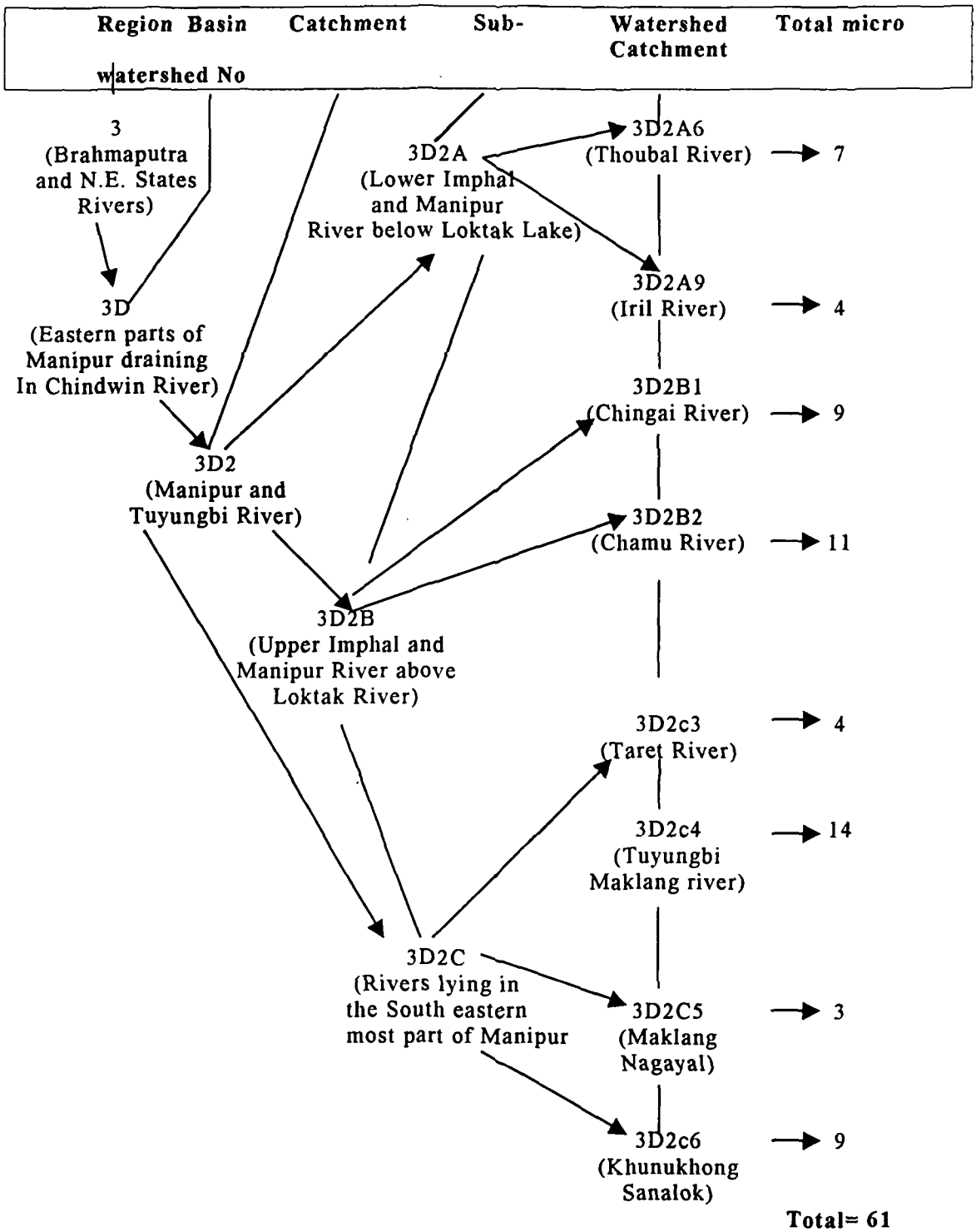
4.2 Area under *Jhum* cultivation:

Monitoring changes in *jhum* areas at different stages i.e., from current *jhum* to abandoned *jhum* and in different periods of time, was done with the help of satellite imagery based datas and maps of 1986-87 and 1993-94. This was the only data which was available.

The micro-alphabilical explanation of watersheds, subsequently identified under sub catchments, catchments, basins and water resource regions are given in fig. 4.7.

Brahmaputra and the north eastern state river's region is represented by numerical number 3. Within this there is a basin which is represented by 3D covering the eastern parts of Manipur and draining into the Chindwin river of Myanmar (Burma). In 3D basin, a catchment area of Manipur river and Tuyungbi river which is 3D2 is further sub-divided into three sub catchments viz 3D2A covering the lower Loktak Lake, 3D2B embracing the upper Imphal and Manipur above Loktak Lake and 3D2C which is represented the rivers lying and in south-easternmost part of Manipur. 3D2A sub-catchment is bifurcated into two watersheds namely, 3D2A6 and 3D2A9 representing Thoubal river and Iril river respectively. 3D2B sub-catchment is divided into two watersheds namely, 3D2B1 and 3D2B2 which represented by Chingai river and Chamu river.

Micro-watershed division of Ukhrul District



Source: Manipur Remote Sensing Application Centre, Imphal (1995).

Fig. 4.7

South-easternmost rivers sub-catchment is represented by 3D2C and is divided into four watersheds namely, 3D2C3, 3D2C4, 3D2C5, and 3D2C6 representing the Taret river, Tuyungbi-Maklang river, Maklang-Nagayal and Khunukhong-Sanalok. Finally 61 micro-watershed is identified in all Ukhrul district. It includes 7 micro-watersheds from 3D2A6, 4 micro- watersheds from 3D2A9, 9 micro-watersheds from 3D2B1, 11 micro-watersheds from 3D2B2, 4 micro-watersheds from 3D2C3, 14 micro-watersheds from 3D2C4, 3 micro-watersheds from 3D2C5 and 9 micro-watersheds from 3D2C6 watershed. To assess the Landuse/landcover in Ukhrul district, statistics of two times i.e., of 1986-87 and of 1993-94 are taken into consideration.

4.2.1: *Jhum* Area Extension in 1986-87:

Before assessing extension under *jhum* in 1986-87, an examination of landuse/landcover of Ukhrul district in the same year is necessary. Six major categories were identified based on standard landuse/ land cover classification (Table 4.1).

In 1986-87, 1,709 hectares which is about 0.38 per cent of the total area of the district was under rural in built up land category. There was no urban built-up land. About 9,340 hectares, which is 2.05 per cent was under agricultural land category. About 99,162 hectares which is about 21.82 per cent was under *jhum* cultivation of which 20,781 hectares or 4.57 per cent was under 1-5 years abandoned *jhum* and 64,150 hectares or about 14.12 per cent was under 5 and above

years of abandoned *jhum*. The remaining 14,231 hectares which is only about 3.13 per cent of the total area was under current *jhum*. Mixed forests covered an area of 340,830 hectares which was 75 per cent to the total area of Ukhrul district.

A detailed *jhum* area and forest area statistics of micro-watersheds is given in table 4.4.

Table 4.4: Micro-watershedwise area under current *jhum*, abandoned *jhum* and mixed forest in Ukhrul District (1986-87)

(Area in Hectare)

S. No.	Name of Watershed	Micro-watershed I.D.	Total Area	Area C.*Jhum*	Area Abadoned *Jhum*		Mixed Forest
					1-5 year	5-aboveYr	
1.	Thoubal River	3D2A6f	5,646	33	227	897	4,201
2.	"	3D2A6g	8,765	126	319	89	7,071
3.	"	3D2A6h	8,564	147	470	1,955	5,233
4.	"	3D2A6j	8,760	196	381	2,926	4,715
5.	"	3D2A6k	5,540	110	411	2,072	2,789
6.	"	3D2A6*l*	8,004	70	331	620	6,554
7.	"	3D2A6m	7,045	131	232	819	4,951
Total			**52,324**	**813**	**2,371**	**9,378**	**35514**
8.	Iril River	3D2A9d	4,760	188	494	1,705	1,646
9.	"	3D2A9e	6,923	339	624	1,092	4,188
10.	"	3D2A9f	10,329	453	596	2,892	6,052
11.	"	3D2A9g	574	--	22	100	452
Total			**22,586**	**980**	**1,736**	**5,789**	**12,338**
12.	Chingai River	3D2B1a	2,672	100	133	854	1,532
13.	"	3D2B1b	6,407	309	129	427	5,374
14.	"	3D2B1d	5,427	20	42	--	5,082

15.	"	3D2B1e	2,225	--	44	--	2,080
16.	"	3D2B1f	10,860	17	465	577	9,210
17.	"7	3D2B1g	3,010	2	197	507	2,181
18.	"	3D2B1h	9,059	439	697	1.498	5,989
19.	"	3D2B1j	8,692	41	247	2,858	4,529
20.	"	3D2B1k	6,415	84	419	1,797	3,642
Total			**54,767**	**1,012**	**2,373**	**8,518**	**39,619**
21.	Chamu River	3D2B2a	7,418	32	570	1,807	4,742
22.	"	3D2B2b	4,039	144	208	853	2,785
23.	"	3D2B2c	6,696	27	120	307	6,007
24.	"	3D2B2d	11,971	189	1,157	3,317	6,629
25.	"	3D2B2e	8,767	70	225	3,355	5,073
26.	"	3D2B2f	6,655	35	415	1,845	4,320
27.	"	3D2B2g	6,247	60	700	2,104	3,246
28.	"	3D2B2h	7.730	65	691	2,025	4,781
29.	"	3D2B2j	8,007	194	348	663	6,704
30.	"	3D2B2k	8,163	431	1.049	2,228	3,991
31	"	3D2B2*l*	6,201	626	340	50	5,086
Total			**81,894**	**1,873**	**5,823**	**18,554**	**53,364**
32.	Taret river	3D2B3b	5,770	313	194	430	4,793
33.	"	3D2B3d	3,825	70	65	260	3,416
34.	"	3D2B3e	2,163	27	352	267	1,477
35.	"	3D2B3F	2,322	81	246	554	1,399
Total			**14,080**	**491**	**857**	**1,511**	**11,085**
36.	Tuyungbi Maklang	3D2B4a	6,511	57	419	702	5,314
37.	"	3D2B4b	6,540	461	164	371	5,544
38.	"	3D2B4c	11,490	564	194	1,034	9,622
39.	"	3D2B4d	12,602	369	326	541	11,221

40.	"	3D2B4e	9,382	444	812	1,529	6,501
41.	"	3D2B4f	4,190	513	387	1,672	1,240
42.	"	3D2B4g	11,193	532	1,048	2,329	7,048
43.	"	3D2B4h	9,054	527	211	779	7,457
44.	"	3D2B4j	9,668	209	282	795	8,182
45.	"	3D2B4k	11,315	597	231	279	9,990
46.	"	3D2B4*l*	9,027	316	461	147	7,997
47.	"	3D2B4*m*	5,849	115	582	1,265	3,766
48.	"	3D2B4n	11,414	546	420	4,886	5,378
49.	"	3D2B4p	3,992	401	--	184	3,373
Total			**,22,227**	**5,651**	**5,537**	**16,513**	**92,633**
50.	Maklang Nagayal	3D2c5a	10,348	746	701	532	8,319
51.	"	3D2c5b	6,347	275	117	377	5,542
52.	"	3D2c5c	868	--	--	--	858
Total			**17,563**	**1,021**	**818**	**909**	**14,719**
53.	Khunukhong Sanalok	3D2B6a	9,750	413	110	137	9,015
54.	"	3D2B6b	9,640	222	253	135	8,949
55.	"	3D2B6c	8,117	308	59	43	7,662
56.	"	3D2B6d	6,272	213	255	384	5,353
57.	"	3D2B6e	11,876	369	343	1,698	9,362
58.	"	3D2B6f	9,262	350	25	170	8,613
59.	"	3D2B6g	9,077	94	44	120	8,704
60.	"	3D2B6h	11,560	269	67	244	10,898
61.	"	3D2B6j	13,405	152	110	47	13,002
Total			**88,959**	**2,390**	**1,266**	**2,978**	**81,558**
Total Ukhrul			**45,4400**	**14,231**	**20,781**	**64,150**	**340,830**

Source: Manipur Remote Sensing Application Centre, Imphal (1995).

Table 4.5: Watershedwise distribution of area under current *jhum*, abandoned *jhum* and mixed forest in Ukhrul District (1986-87)

(in percentage)

S. No.	Name of Watershed	Percentages								Others	Total
		Current *Jhum*	Rank	1-5 A.*Jhum*	Rank	5-above Yrs A.*Jhum*	Rank	M.Forest	Rank		
1.	Thoubal River	1.55	8	4.53	7	17.92	3	67.87	6	8.12	100.00
2.	Iril River	4.34	3	7.69	1	25.63	1	54.63	8	7.72	100.00
3.	Chingai River	1.85	7	4.33	6	15.55	4	72.34	5	5.93	100.00
4.	Chamu river	2.29	6	7.11	2	22.66	2	65.16	7	2.78	100.00
5.	Taret river	3.49	4	6.09	3	10.73	6	78.73	3	0.96	100.00
6.	Tuyungbi Maklang river	4.62	2	4.53	5	13.51	5	75.79	4	1.55	100.00
7.	Maklang Nagayal river	5.81	1	4.66	4	5.18	7	83.81	2	0.54	100.00
8.	Khunukhong Sanalok	2.69	5	1.42	8	3.35	8	91.68	1	0.86	100.00
Total Ukhrul District		**3.13**		**4.57**		**14.12**		**75.00**		**3.18**	**100.00**

Source: Manipur Remote Sensing Application Centre, Imphal (1995).

A perusal of table 4.5 shows that in the eight watershed regions of Ukhrul district only 3.13 per cent of the total area was under current *jhum*, 4.57 per cent under 1 to 5 years category of abandoned *jhum*, 14.12 per cent under 5 and above years of abandoned *jhum* and 75 per cent under mixed forests. These figures differ from region to region and from one watershed to another. Even in regions which were having very steep slopes and hilly terrain, the area under current *jhum* was high.

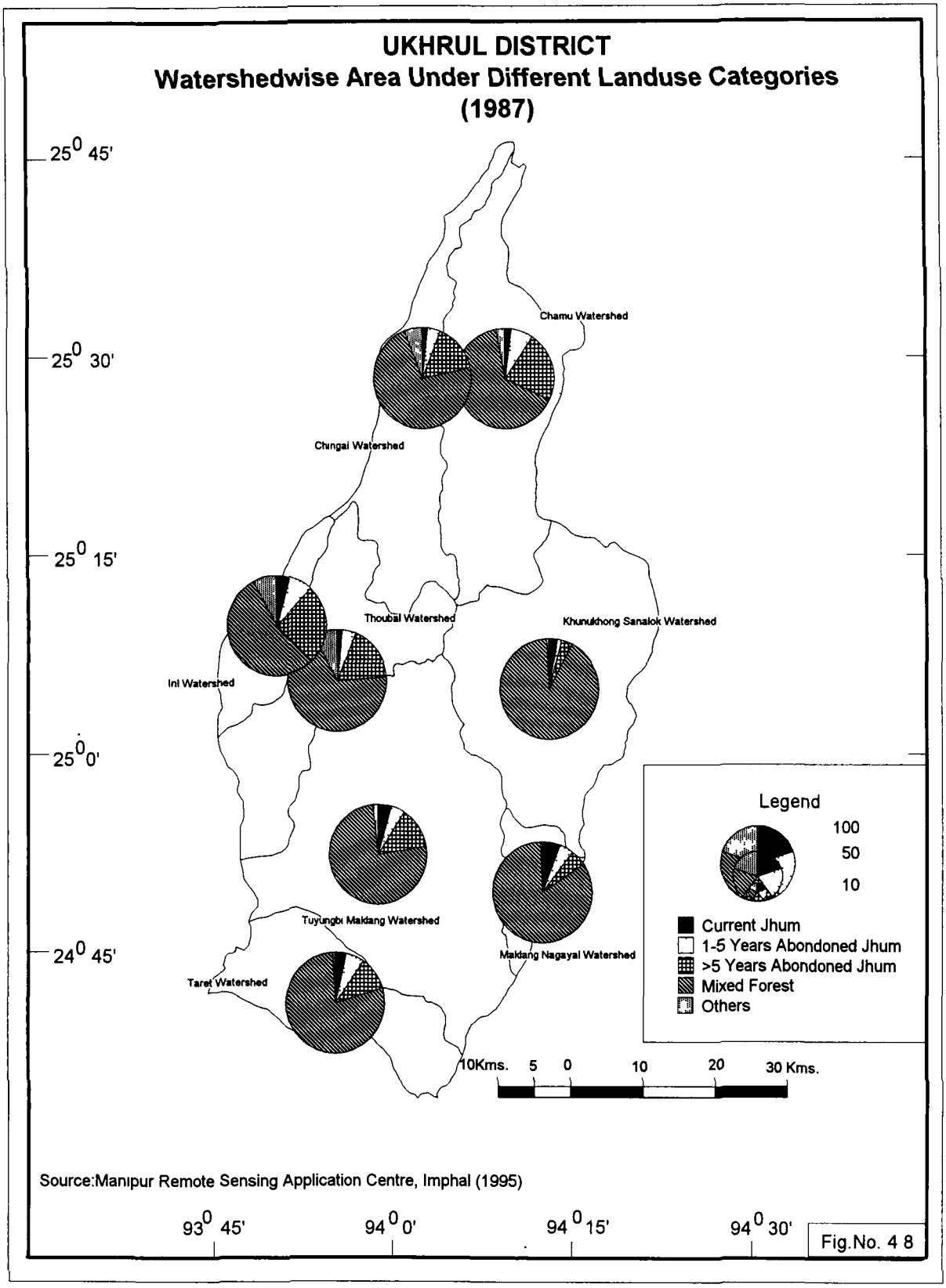

UKHRUL DISTRICT
Watershedwise Area Under Different Landuse Categories
(1987)
25° 45'
25° 30'
25° 15'
25° 0'
24° 45'
Chamu Watershed
Chingai Watershed
Thoubal Watershed
Khunukhong Sanalok Watershed
Inl Watershed
Tuyungbi Maklang Watershed
Maklang Nagayal Watershed
Taret Watershed
Legend
100
50
10
Current Jhum
1-5 Years Abondoned Jhum
>5 Years Abondoned Jhum
Mixed Forest
Others
10Kms. 5 0 10 20 30 Kms.
Source:Manipur Remote Sensing Application Centre, Imphal (1995)
93° 45'
94° 0'
94° 15'
94° 30'

Fig.No. 4 8

Highest percentage of area under current *jhum* was observed in Maklang Nagayal river watershed (5.8 per cent) followed by Tuyungbi Maklang river watershed (4.62 per cent), Iril river watershed (4.34 per cent), Taret river watershed (3.49 per cent), Khunukhong Sanalok river watershed (2.69 per cent), Chamu river watershed (2.79 per cent), Chingai river water shed (1.85 per cent) and Thoubal river water shed (1.55 per cent).

Area under abandoned *jhum* category (1 to 5 years) showed that Iril river watershed had the maximum percentage of the area (7.69%) followed by Chamu river watershed (7.11%), Taret river water shed (6.09%), Tuyungbi Maklang river watershed (4.53 per cent), Chingai river watershed (4.33 per cent), Thoubal river watershed (4.53 per cent) and Khunukhong Sanalok river watershed (1.42 per cent).

Iril river watershed had the highest percentage of area (25.63 per cent) under 5 and above years of abandoned *jhum* followed by Chamu river watershed (22.66 per cent), Thoubal river watershed (17.92 per cent), Chingai river watershed (15.55 per cent), Tuyungbi-Maklang river watershed (13.51per cent), Taret river watershed (10.73 per cent), Maklang Nagayal river watershed (5.18 per cent) and Khunukhong Sanalok river watershed (3.35 per cent).

Regarding the area under mixed forest, Khunukhong Sanalok river watershed (91.68 per cent), Maklang Nagayal river watershed (83.81per cent), Taret river watershed (78.73 per cent), Tuyungbi Maklang river watershed (75.79 per cent) and Chingai river watershed

(72.34 per cent) have more than 70 per cent of their area under mixed forest. Whereas, Thoubal river watershed (67.87 per cent), Chamu river watershed (65.16 per cent) and Iril river watershed (54.63 per cent) have more than 54 per cent of their area under mixed forest.

It is observed that those watersheds like Iril river watershed, Chamu river watershed, Thoubal river watershed and Chingai river watershed which have large area under 5 and above years of abandoned *jhum* have comparatively lesser area under mixed forests and vice-versa. Those watersheds, which have lesser area under abandoned *jhum* have more area under mixed forests. This is, obviously, because of *jhum* and forest relation. In the area where intensive *jhuming* is practised, the forest area is lesser and vice-versa. It also shows that intensive *jhum* poses a heavy pressure on forest and land resources.

4.2.2: Jhum area extension in 1993-94:

In 1993-94, 1,709 hectares which is about 0.38 per cent of the total area of Ukhrul district was under the rural category within built up land. No urban area exist within Ukhrul district as the population of built up area is less than it should-be to come under the urban category. Agricultural land was divided into two- crop land and fallow (plains). There is no area under crop land category as the time of taking satellite imagery in that particular year was done after harvesting of crops. However, an area of 9,340 hectares or 2.05 per cent to the total area of this district comes under fallow (plans) category. Shifting cultivation area is separated from agricultural land

area. The category of shifting cultivation is divided into two heads current *jhum* where *jhuming* is going on presently and abandoned *jhum* where the area is left for natural recuperation. The current *jhum* area is 8,460 hectares which is 1.86 per cent of the total area of the district. A total area of 154,087 hectares was under abandoned *jhum* in 1993-94 with 29,082 hectares under 1-5 years abandoned *jhum* and 125,005 hectares under 5 and above years abandoned *jhum*. The share of 1-5 years abandoned *jhum* and 5-above years abandoned *jhum* were 6.40 per cent and 27.51 per cent of the total area of the district. Mixed forest covered an area of 177,445 hectares which is about 61.06 per cent while water bodies covered 0.39 per cent of the total area of Ukhrul district. About 0.35 per cent was covered by roads and other small *Kuccha* lanes in the district.

Table 4.6: Micro-watershedwise area under current *jhum*, abandoned *jhum* and mixed forest in Ukhrul District 1993-94

(Area in Hectare)

S. No.	Name of Watershed	Micro-watershed I.D.	Total Area	Area C.*Jhum*	Area Abadoned *Jhum*		Mixed Forest
					1-5 year	5-aboveYr	
1.	Thoubal River	3D2A6f	5,646	47	221	--	5,090
2.	"	3D2A6g	8,765	136	321	382	6,766
3.	"	3D2A6h	8,564	53	339	3,445	3,968
4.	"	3D2A6j	8,760	23	724	4,499	2,972
5.	"	3D2A6k	5,540	30	16	3,389	1,947
6.	"	3D2A6*l*	8,004	--	712	6,488	375
7.	"	3D2A6m	7,045	147	140	3,746	2,100
Total			**52,324**	**436**	**2,473**	**21,949**	**23,218**
8.	Iril River	3D2A9d	4,760	68	1,249	2,500	216
9.	"	3D2A9e	6,923	159	747	3717	1620
10.	"	3D2A9f	10,329	161	800	5246	3786
11.	"	3D2A9g	574	--	--	122	452

Total			**22,586**	**388**	**2796**	**11585**	**6074**
12.	Chingai River	3D2B1a	2672	147	115	1825	532
13.	"	3D2B1b	6407	304	282	1268	4385
14.	"	3D2B1d	5427	40	708	243	4159
15.	"	3D2B1e	2225	--	424	--	1700
16.	"	3D2B1f	10860	14	1887	797	7571
17.	"	3D2B1g	3010	--	337	630	1920
18.	"	3D2B1h	9059	10	1120	2306	5187
19.	"	3D2B1j	8692	80	47	7271	277
20.	"	3D2B1k	6415	--	182	4744	1016
Total			**54,767**	**595**	**5102**	**19084**	**26,747**
21.	Chamu River	3D2B2a	7,418	292	572	4122	2165
22.	"	3D2B2b	4,039	207	414	2411	958
23.	"	3D2B2c	6,696	45	440	465	5511
24.	"	3D2B2d	11,971	596	1525	6310	2858
25.	"	3D2B2e	8767	224	280	6650	1579
26.	"	3D2B2f	6,655	184	216	5057	1158
27.	"	3D2B2g	6,247	503	407	4348	852
28.	"	3D2B2h	7730	267	1730	3722	1843
29.	"	3D2B2j	8007	176	624	2057	5052
30.	"	3D2B2k	8163	114	950	5197	1431
31	"	3D2B2l	6201	75	913	554	4560
Total			**81,894**	**2683**	**8071**	**40893**	**27967**
32.	Taret river	3D2B3b	5770	17	91	104	5518
33.	"	3D2B3d	3825	71	254	66	3411
34.	"	3D2B3e	2163	20	10	400	1693
35.	"	3D2B3F	2322	70	52	1070	1088
Total			**14,080**	**178**	**407**	**1640**	**11710**
36.	Tuyungbi Maklang	3D2B4a	6511	--	99	24	6364
37.	"	3D2B4b	6540	129	235	221	5955

38.	"	3D2B4c	11490	219	352	707	10136
39.	"	3D2B4d	12602	84	586	757	11030
40.	"	3D2B4e	9382	90	114	1937	7145
41.	"	3D2B4f	4190	214	422	1450	1726
42.	"	3D2B4g	11193	181	292	4861	5623
43.	"	3D2B4h	9054	69	501	425	7979
44.	"	3D2B4j	9668	253	501	670	8044
45.	"	3D2B4k	11315	118	858	2551	7570
46.	"	3D2B4*l*	9027	313	619	94	7895
47.	"	3D2B4*m*	5849	112	247	1725	3643
48.	"	3D2B4n	11414	61	798	6724	3656
49.	"	3D2B4p	3992	5	--	270	3683
Total			**1,22,227**	**1848**	**5624**	**22416**	**90449**
50.	Maklang Nagayal	3D2c5a	10,348	607	328	1202	8161
51.	"	3D2c5b	6347	122	--	415	5774
52.	"	3D2c5c	868	--	--	--	858
Total			**17,563**	**729**	**328**	**1617**	**14793**
53.	Khunukhong Sanalok	3D2B6a	9750	655	82	170	8768
54.	"	3D2B6b	9640	190	137	649	8583
55.	"	3D2B6c	8117	63	597	642	6770
56.	"	3D2B6d	6272	191	322	476	5216
57.	"	3D2B6e	11876	183	773	1830	8986
58.	"	3D2B6f	9262	252	437	385	8084
59.	"	3D2B6g	9077	23	134	319	8486
60.	"	3D2B6h	11560	25	1710	1188	8555
61.	"	3D2B6j	13405	21	89	162	13039
Total			**88,959**	**1603**	**4281**	**5821**	**76487**
Total Ukhrul			**45,4400**	**8460**	**29082**	**125005**	**277445**

Source: Manipur Remote Sensing Application Centre, Imphal (1995).

Table 4.7: Watershedwise distribution of area under current *jhum*, abandoned *jhum* and mixed forest in Ukhrul District (1993-94)

(in percentage)

S. No	Name of Watershed	Percentages								Others	Total
		C *Jhum*	Rank	1-5 A.*Jhum*	Rank	5-above Yrs A.*Jhum*	Rank	M Forest	Rank		
1.	Thoubal River	0.83	8	4 73	5	41.95	3	44.37	6	8.12	100.00
2.	Iril River	1.72	4	12.38	1	51.29	1	26.89	8	7.72	100.00
3.	Chingai River	1.09	7	9.32	3	34.85	4	48.84	5	5.90	100.00
4.	Chamu river	3.28	2	9.86	2	49.93	2	34.15	7	2.78	100.00
5.	Taret river	1.26	6	2.89	7	11.65	6	83.17	3	1.03	100.00
6.	Tuyungbi Maklang river	1.51	5	4.60	6	18.34	5	74.00	4	1.55	100.00
7.	Maklang Nagayal river	4.15	1	1.87	8	9.21	7	84.23	2	0.54	100.00
8.	Khunukhong Sanalok	1.80	3	4.81	4	6.54	8	85.98	1	0.87	100.00
Ukhrul District		1.86		6.40		27.51		61.06		3.17	100.00

Source: Manipur Remote Sensing Application Centre, Imphal (1995).

A perusal of table 4.6 shows that in 1993-94 in Ukhrul district 1.86 per cent of the total area was under current *jhum*, 6.40 per cent under 1 to 5 years abandoned *jhum*, 27.51 per cent under 5 and above years abandoned *jhum* and 61.06 per cent under mixed forests.

It is observed that highest percentage of area under current *jhum* was in Maklang Nagayal river watershed (4.15 per cent) followed by Chamu river watershed (3.28 per cent), Khunukhong Sanalok river watershed (1.80 per cent), Iril river watershed (1.72 per cent), Tuyungbi Maklang river watershed (1.51 per cent), Taret river watershed (1.26 per cent), Chingai river watershed (1.09 per cent) and

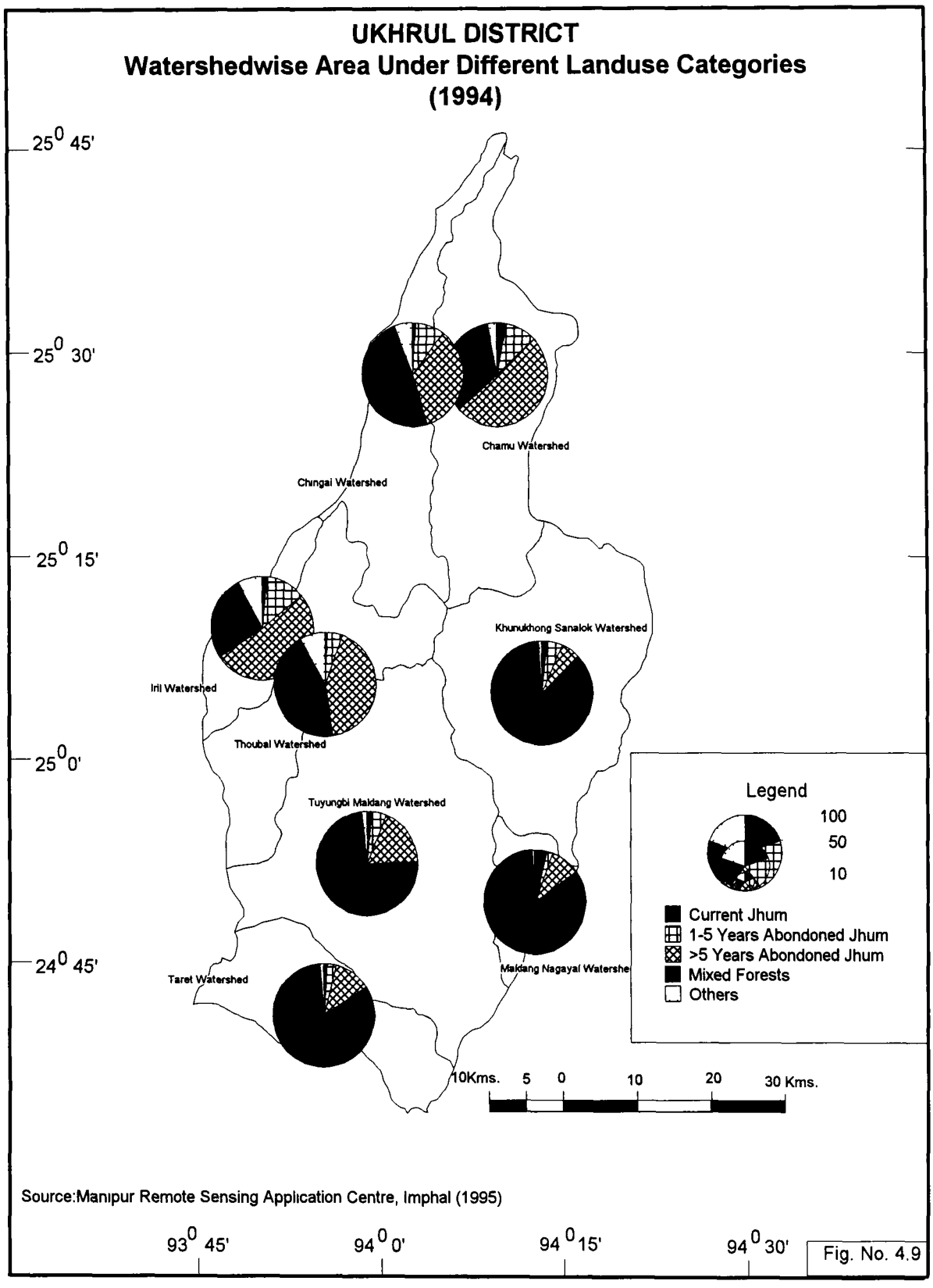

UKHRUL DISTRICT
Watershedwise Area Under Different Landuse Categories
(1994)
25° 45'
25° 30'
25° 15'
25° 0'
24° 45'
Chamu Watershed
Chingai Watershed
Khunukhong Sanalok Watershed
Iril Watershed
Thoubal Watershed
Tuyungbi Maklang Watershed
Taret Watershed
Maklang Nagayai Watershe
Legend
100
50
10
Current Jhum
1-5 Years Abondoned Jhum
>5 Years Abondoned Jhum
Mixed Forests
Others
10Kms. 5 0 10 20 30 Kms.
Source:Manipur Remote Sensing Application Centre, Imphal (1995)
93° 45'
94° 0'
94° 15'
94° 30'

Fig. No. 4.9

Thoubal river watershed (0.83 per cent). Maklang Nagayal river watershed had highest percentage of current *jhum* both in 1986-87 and 1993-94 while Thoubal river watershed had lowest percentage of current *jhum* in both assessment years.

It is also observed that area under 1-5 years abandoned *jhum* is highest in Iril river watershed (12.38 per cent) followed by Chamu river watershed (9.86 per cent) and Chingai river watershed (9.32 per cent). These watersheds have more than 9 per cent of the total area under 1 to 5 years abandoned *jhum* category. Remaining other watersheds have low percentages under 1-5 years abandoned *jhum* ranging from 4.81 per cent in Khunukhong Sanalok watershed to 1.87 per cent in Maklang Nagayal river watershed.

Area under 5 and above years abandoned *jhum* is highest in Iril river watershed. More than 50 per cent of the total area of the watershed is under this abandoned *jhum* category in Iril river watershed. Chamu river watershed (49.93 per cent) and Thoubal river watershed (41.95 per cent) also have more than 40 per cent of the total area under 5 and above years abandoned *jhum* category. Chingai river watershed has 34.85 per cent followed by Tuyungbi Maklang river watershed (18.34 per cent), Taret river watershed (11.65 per cent) Maklang Nagayal river watershed (9.21 per cent) and Khunukhong Sanalok river watershed (6.54 per cent).

Thus, there are wide variation in the area under current *jhum*, 1 to 5 years abandoned *jhum*, 5 and above years abandoned and in area

under mixed forest in different watersheds. It is observed that if the area under *jhum* (including current and abandoned) is high, the area under mixed forest is low.

The Khunukhong Sanalok river watershed, which has the lowest percentage of area under 5 and above years abandoned *jhum* (6.54 per cent), has the highest percentage of area under mixed forest (85.98 per cent) while Iril river watershed, which has highest percentage of area under 5 and above years abandoned *jhum* (51.29 per cent), has lowest percentage under mixed forests (26.89 per cent). Maklang Nagayal river watershed has 34.23 per cent of the total area under mixed forest followed by Taret river watershed (83.17 per cent), Tuyungbi Maklang river watershed (74.00 per cent), Chingai river watershed (48.84 per cent), Thoubal river watersheds (44.37 per cent), Chamu river watershed (34.15 per cent) and Iril river watershed (26.89 per cent).

It is observed from the above discussions that the eastern most side of Ukhrul district comprising of Taret river watershed, Tuyungabi Maklang river watershed, Maklang-Nagayal river watershed and Khunukhong-Sanalok river watershed has less area under *jhum* but more area of mixed forest. This means no intensive *jhum* is practised in this region perhaps due to its extremely remoteness and sparse population. Whereas, western side of the district extending north to south has low percentage of forest area but high percentage of *jhum* area. It shows intensive *jhum* in this region due to population pressure.

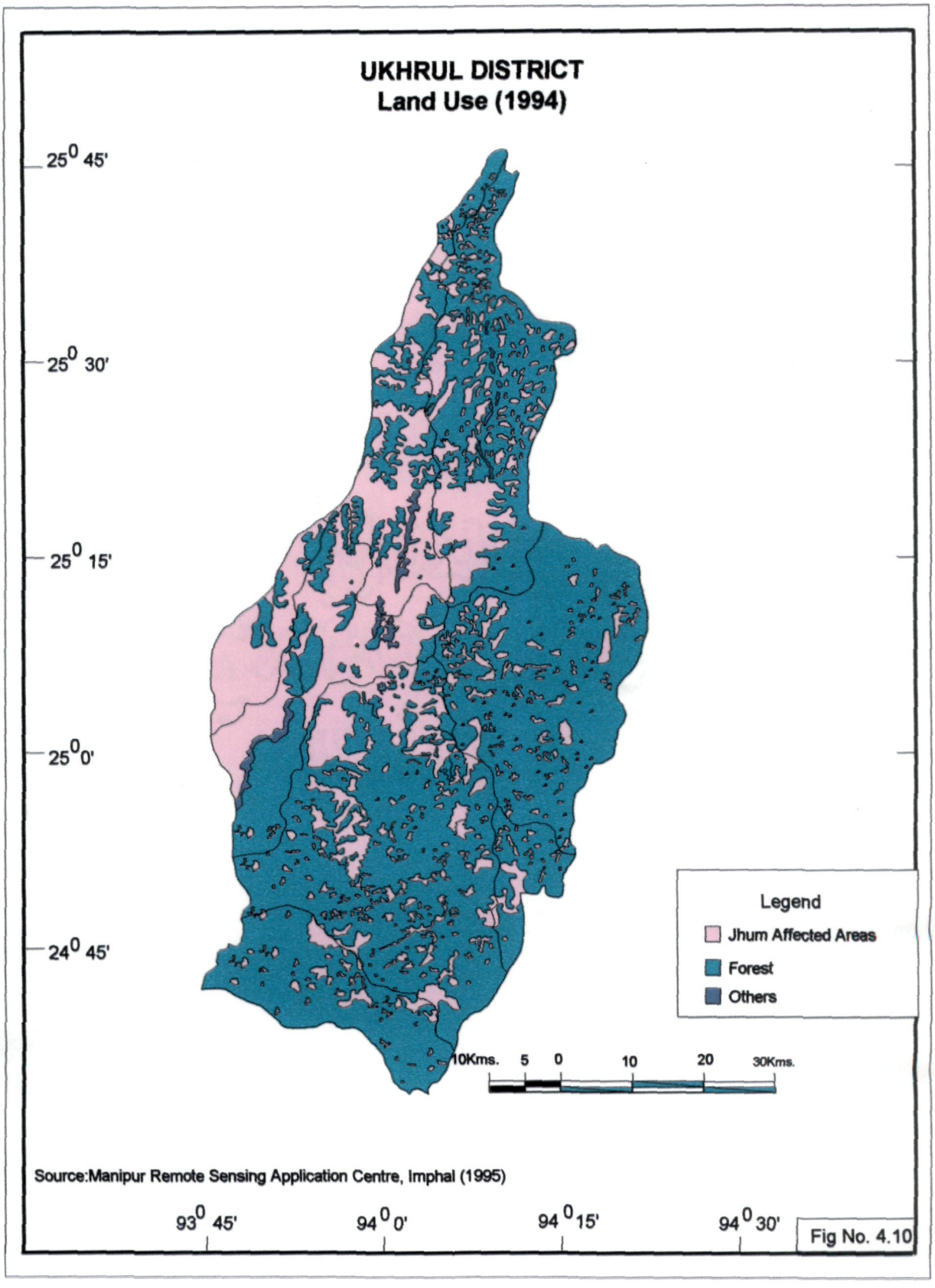

UKHRUL DISTRICT
Land Use (1994)
25° 45'
25° 30'
25° 15'
25° 0'
24° 45'
Legend
Jhum Affected Areas
Forest
Others
10Kms. 5 0 10 20 30Kms.
Source:Manipur Remote Sensing Application Centre, Imphal (1995)
93° 45'
94° 0'
94° 15'
94° 30'

Fig No. 4.10

4.2.3: Landuse and Landcover Changes:

Comparison of two time landuse data (1986-87 and 1993-94) helps in detecting changes in the area under current *jhum* and abandoned *jhum*. Total and micro-watershed wise landuse and landcover changes in the district are shown in Tables 4.8 and 4.9.

Table 4.8: Landuse/Landcover changes from 1986-87 to 1993-94 in Ukhrul district.

Sl. No.	Category	Area (in hectare)
1.	*Jhum* cultivation	
	A. Current *jhum* 1987 & 1994	915 (0.2)
	B. Abandoned *jhum*	
	i. 1 to 5 years abandoned *jhum* to current *jhum* (1994)	1,147(0.25)
	ii. 5 and above years abandoned *jhum* to current *jhum* (1994)	2,620 (0.58)
	Total abandoned *jhum* to current *jhum* (1994)	3,767 (0.83)
2.	Forest:	
	A. Primary forest:	
	i. Deciduous forest to current *jhum* (1994)	--
	B. Secondary forest:	
	i. Mixed forest to current *jhum* (1994)	3778 (0.83)
	Total transfer of land from abandoned *jhum* and mixed forest to current *jhum* (1994)	7545 (1.86)

Note: Figures in brackets are percentage to the total area of Ukhrul District.
Source: Manipur Remote Sensing Application Centre, Imphal (1995).

It is observed that in Ukhrul district an area of 3,778 hectares (0.83 per cent) had undergone change from mixed forest in 1987 to current *jhum* in 1994. An area of 3,767 hectares (0.83 per cent) of abandoned *jhum* has been transferred into current *jhum* in 1994. The 915 hectares which was under current *jhum* in 1987 has remained the

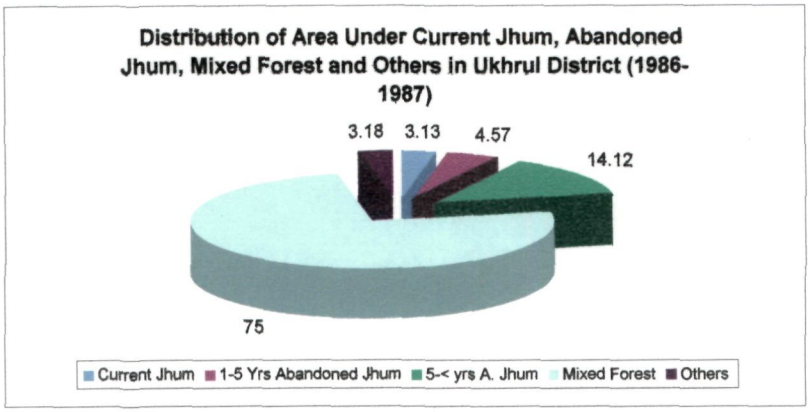


Fig. 4.11

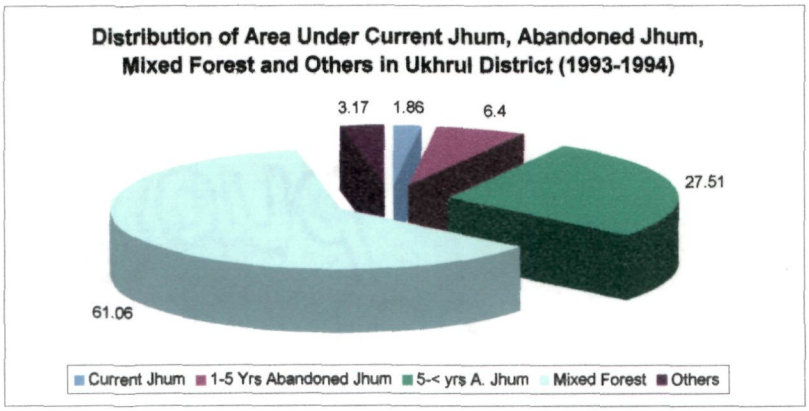


Fig. 4.12

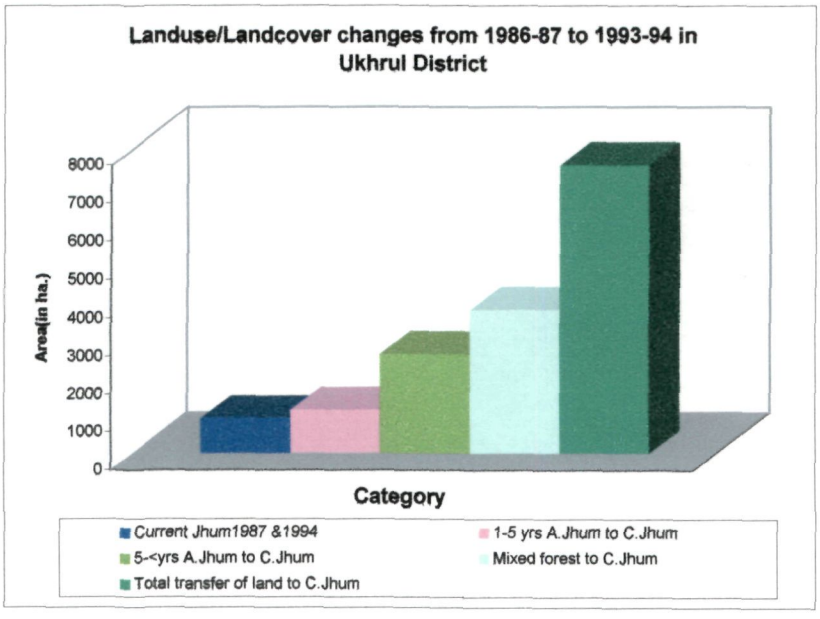


Fig. 4.13

Source: Manipur Remote Sensing Application Centre, Imphal (1995)

same i.e. it is also under current *jhum* in 1994. It is also observed that in some pockets the *jhum* cycle has been reduced to 4 to 5 years. An area of 915 hectares (0.20 per cent) in Ukhrul district under current *jhum* in both years reveals that *jhum* cycle of seven years or more still exists in some pockets.

Table 4.9: Micro-watershedwise landuse/land cover changes in Ukhrul district (1987-94).

S. No.	Name of Watershed	Micro watershed (I.D.)	C.*Jhum* 1987 to C.*Jhum* 1994	A.*Jhum* (1-5 Yrs.) 1987 to C.*Jhum* 1994	A.*Jhum* (5-above yrs) 1987 to C.*Jhum* 1994	Mixed Fores 1987 to Current *Jhum* 1994
1.	Thoubal River	3D2A6f	--	3	22	22
2.	"	3D2A6g	20	16	100	--
3.	"	3D2A6h	15	10	17	10
4.	"	3D2A6j	10	3	--	10
5.	"	3D2A6k	15	15	--	--
6.	"	3D2A6*l*	--	--	--	--
7.	"	3D2A6m	23	120	--	4
Total			**83**	**167**	**139**	**46**
8.	Iril River	3D2A9d	--	8	--	60
9.	"	3D2A9e	5	72	60	22
10.	"	3D2A9f	10	--	109	42
11.	"	3D2A9g	--	--	--	--
Total			**15**	**80**	**169**	**124**
12.	Chingai River	3D2B1a	20	32	95	--
13.	"	3D2B1b	102	8	100	94
14.	"	3D2B1d	--	--	--	40

15.	"	3D2B1e	--	--	--	--
16.	"	3D2B1f	--	--	--	14
17.	"	3D2B1g	--	--	--	--
18.	"	3D2B1h	--	--	--	10
19.	"	3D2B1j	5	5	70	6
20.	"	3D2B1k	--	--	--	--
Total			**127**	**45**	**265**	**164**
21.	Chamu River	3D2B2a	50	62	180	--
22.	"	3D2B2b	35	18	77	77
23.	"	3D2B2c	3	4	38	--
24.	"	3D2B2d	93	68	435	--
25.	"	3D2B2e	--	110	74	40
26.	"	3D2B2f	7	2	175	--
27.	"	3D2B2g	46	60	389	8
28.	"	3D2B2h	21	45	166	35
29.	"	3D2B2j	60	25	12	78
30.	"	3D2B2k	12	52	--	50
31	"	3D2B2*l*	34	22	--	19
Total			**361**	**468**	**1546**	**307**
32.	Taret river	3D2B3b	--	--	--	17
33.	"	3D2B3d	11	20	20	20
34.	"	3D2B3e	--	20	--	--
35.	"	3D2B3F	15	15	15	25
Total			**26**	**55**	**35**	**62**
36.	Tuyungbi Maklang	3D2B4a	--	--	--	--

37.	"	3D2B4b	37	15	10	67
38.	"	3D2B4c	--	50	100	69
39.	"	3D2B4d	4	--	--	80
40.	"	3D2B4e	5	20	6	65
41.	"	3D2B4f	25	--	75	116
42.	"	3D2B4g	9	115	--	57
43.	"	3D2B4h	15	15	15	24
44.	"	3D2B4j	--	48	42	118
45.	"	3D2B4k	--	--	--	228
46.	"	3D2B4*l*	--	--	--	313
47.	"	3D2B4*m*	11	4	11	96
48.	"	3D2B4n	28	--	15	18
49.	"	3D2B4p	2	1	--	2
Total			**136**	**268**	**274**	**1253**
50.	Maklang Nagayal	3D2c5a	28	35	63	481
51.	"	3D2c5b	5	--	40	--
52.	"	3D2c5c	--	--	--	--
Total			**33**	**35**	**103**	**481**
53.	Khunukhong Sanalok	3D2B6a	46	29	74	506
54.	"	3D2B6b	14	--	15	161
55.	"	3D2B6c	3	--	--	60
56.	"	3D2B6d	2	--	--	189
57.	"	3D2B6e	--	--	--	183
58.	"	3D2B6f	41	--	--	211
59.	"	3D2B6g	10	--	--	13

60.	"	3D2B6h	8	--	--	7
61.	"	3D2B6j	10	--	--	11
Total			**134**	**29**	**89**	**1341**
Total Ukhrul			**915**	**1147**	**2620**	**3778**

Source: Manipur Remote Sensing Application Centre, Imphal (1995).

Table 4.9 is showing the landuse and landcover changes from 1986-87 to 1993-94 in different watersheds of Ukhrul district. In Thoubal river watershed, transformation has taken place from area under different categories in 1987 to current *jhum* in 1994. An area of 83 hectares under current *jhum* remained the same in both the years. Another 167 hectares of abandoned *jhum* land (1-5 years) and 139 hectares under 5 and above years abandoned *jhum* has been transformed into current *jhum*, while 46 hectares of mixed forest has been transformed into current *jhum*.

In Iril river watershed, an area of 32 hectares and 169 hectares under 1 to 5 years and 5 and above years abandoned *jhum* has been transformed into current *jhum*. In this watershed, 124 hectares of land which was under mixed forest in 1987 had changed into current *jhum* in 1994 while 15 hectares remained same in both the years.

In Chingai river watershed, 164 hectares of mixed forest area (in 1987) has been pushed out by current *jhum* (in 1994). A total of 310 hectares of land which was under abandoned *jhum* (both categories) has changed into current *jhum*. Whereas, 127 hectares of current *jhum* has remained the same in both the years.

Chamu river watershed had an area of 307 hectares under mixed forest in 1987 which was transformed into current *jhum* in 1994. A total of 2,014 hectares of abandoned *jhum* has also been transformed to current *jhum*, while 361 hectares of current *jhum* remained the same in both the years.

In Taret river watershed, 62 hectares of area under mixed forest changed into current *jhum*. Another 90 hectares of abandoned *jhum* has also transformed into current *jhum* in 1994 while 25 hectares of lands under current *jhum* remained the same in both the years.

In Tuyungbi–Maklang river watershed, a large area i.e., 1,253 hectares of mixed forest in 1987 was cleared for current *jhum* in 1994 while 524 hectares of abandoned *jhum* had undergone change into current *jhum*. An area of 136 hectares of current *jhum* had not changed but remained the same.

Maklang Nagayal river watershed was also not very different from other watersheds. About 481 hectare of mixed forest area in 1987 was converted into current *jhum* in 1994. An area of 33 hectares of current *jhum* has remained the same in both the years, while 138 hectares of land under abandoned *jhum* has transformed as current *jhum*.

In Khunukhong Sanalok watershed, 1,341 hectares of mixed forest area in 1987 had gone to current *jhum*, while 134 hectares under current *jhum* remained the same in both the years.

Thus, it is observed that transformation to current *jhum* either from forest area or from abandoned *jhum* in all the watersheds shows the continuation of *jhum* roughly in all region embracing all villages in the latest assessment year also.

Increase or decrease in the area under different categories in the latest assessment year is known by comparing two time landuse and landcover data. (Tables 4.5 and 4.7). The percentage of area under current *jhum*, abandoned *jhum* and forest differs from watershed to watershed. In Thoubal river watershed, 24 per cent of the total area was covered by *jhum* category with 1.55 per cent under current *jhum*, while 67.87 per cent was covered by mixed forest in 1986–87. The area of mixed forest had decreased to 44.37 per cent of the total area in 1994 and so the percentage of *jhum* category increased to 47.51. Interestingly, the percentage of current *jhum* decreased from 1.55 to only 0.83 in 1994.

Iril river watershed had only 26.89 per cent under *jhum* category with 1.72 per cent under current *jhum* in 1994. It had 54.63 per cent under forest and 37.66 per cent under *jhum* category with 4.35 per cent under current *jhum* in 1987. It shows a decrease of 27.74 per cent in forest area while an increase of 27.73 per cent in *jhum* area. But the area under current *jhum* decreased from 4.34 per cent in 1987 to 1.72 per cent in 1994.

In Chingai river watershed, 72.34 per cent was covered by forest while 21.73 per cent was under *jhum* with 1.85 per cent under current

jhum in 1986–87. Forest area decreased to 48.84 per cent in 1994 while the area under *jhum* increased to 45.26 per cent. Current *jhum* area had decreased from 1.85 per cent to 1.09 per cent.

Chamu river watershed in which 65.16 per cent area was covered by forest while 32.06 per cent was under *jhum* in 1986–87. The forest area had decreased to 34.15 per cent while area under *jhum* increased to 63.07 per cent. Area under current *jhum* increased from 2.29 per cent in 1986–87 to 3.28 per cent in 1993–94.

Thus, in other four watersheds i.e., Taret river watershed, Tuyungbi-Maklang river watershed, Maklang-Nagayal river watershed and Khunukhong Sanalok river watershed, 78.73 per cent, 75.79 per cent, 83.81 per cent and 91.68 per cent of the total area of the watersheds was under forest cover in 1987 whereas in 1994 it was 83.17 per cent, 74.00 per cent, 87.23 per cent and 85.98 per cent respectively. This is obviously true that where the percentage of forest increased, the percentage of *jhum* decreased and vice–versa.

Thus, in Ukhrul district, 75.00 per cent of the total area available was under forest cover while 21.82 per cent was under *jhum* with only 3.13 per cent under current *jhum* in 1986–87. But in 1993–94, the area under mixed forest and *jhum* were 61.06 per cent and 35.77 per cent respectively with 1.86 per cent under current *jhum* category. Though the area under total *jhum* category has increased from 21.82 per cent in 1986–87 to 35.77 per cent in 1993–94, the area of current *jhum* decreased from 3.13 per cent in 1986–87 to 1.86 per cent in 1993–94.

4.3: Slope Analysis

Slope is an angular measurement of any landscape. It is a symbol which depicts the stage of evolution of landscape because the degree of slope or the slope gradient defines the stage of development of landscapes. It is also one of the most important physiographic aspect to understand properly and precisely the physical environment of the area. It directly or indirectly influences the human activities as well as the natural resources.

The amount of slope can be expressed in several ways. Here, a simple formula is considered to analyze the slope of the study area. The tangent of an angle θ (pronounced as 'theta') is arrived by the vertical interval (VI) divided with the horizontal equivalent (HE). It can be represented mathematically as,

$$\text{Tan } \theta = \frac{VI}{HE} \qquad (1)$$

$$\text{or} \quad \theta = \text{Tan}^{-1} \frac{VI}{HE} \qquad (2)$$

The slope categories thus derived are grouped into different class interval as shown below:

Sl.No.	Category	Percentage Slope
1.	*Nearly Level*	*Less than 0%*
2.	Very gentle sloping	1 – 3%

3.	Gentle sloping	3 – 5%
4.	Moderately sloping	5 – 10%
5.	Strongly sloping	10 – 15%
6.	Moderately steep to steep slope	15 – 35%
7.	Very steep slope	More than 35%

Based on the above slope categories, micro-watershedwise slope area statistics of Ukhrul district are given in Tables 4.10 and 4.11.

Table 4.10: Slope categories and area under different categories in Ukhrul district.

S. No.	Category	Slope (in %)	Area (in ha.)	%age to the total area
1.	Nearly Level	< 1	00.00	00.00
2.	Very gentle slope	1-3	1,174.00	0.25
3.	Gentle slope	3 – 5	1,726.00	0.38
4.	Moderately sloping	5 – 10	346.00	0.08
5.	Strongly sloping slope	10 – 15	6,465.00	1.43
6.	Moderately steep to steep slope	15 – 35	73,975.00	16.28
7.	Very steep slope	> 35	370,714.00	81.58
Total area of Ukhrul			**454,400.00**	**100.00**

Source: Manipur Remote Sensing Application Centre, Imphal (1995).

Table 4.11: Micro-watershedwise slope area statistics of Ukhrul district

(in Hectares)

S.No.	Name of Watershed	Micro-watershed I.D.	Nearly Level (0-1%)	Very Gentle Sloping (1-3%)	Gently Sloping (3-5%)	Moderately Sloping (5-10%)	Strongly Sloping (10-15%)	Moderately steep to steep slope (15-35%)	Very steep slope (Above 35%)	Total
1	2	3	4	5	6	7	8	9	10	11
1.	Thoubal River	3D2A6f	--	494	--	--	--	527	4625	5646
2.	"	3D2A6g	--	485	--	--	30	3322	4928	8765
3.	"	3D2A6h	--	195	--	20	270	1920	6159	8564
4.	"	3D2A6j	--	--	--	20	270	1920	6550	8760
5.	"	3D2A6k	--	--	--	15	157	250	5118	5540
6.	"	3D2A6l	--	--	--	--	235	1485	6284	8004
7.	"	3D2A6m	--	--	--	--	278	1930	4837	7045
Total			--	**1174**	--	**55**	**1240**	**11354**	**38501**	**52324**
8.	Iril River	3D2A9d	--	--	215	30	--	2117	2398	4760
9.	"	3D2A9e	--	--	450	--	--	2750	3723	6923
10.	"	3D2A9f	--	--	--	30	19	3322	6958	10329
11.	"	3D2A9g	--	--	--	--	--	--	574	574
Total			--	--	**665**	**60**	**19**	**8189**	**13653**	**22586**

12.	Chingai River	3D2B1a	--	--	--	--	--	337	2335	2672
13.	"	3D2B1b	--	--	54	--	--	655	5698	6407
14.	"	3D2B1d	--	--	257	179	557	245	4189	5427
15.	"	3D2B1e	--	--	178	--	35	115	1897	2225
16.	"	3D2B1f	--	--	175	--	735	1314	8636	10860
17.	"	3D2B1g	--	--	--	52	10	20	2928	3010
18.	"	3D2B1h	--	--	--	--	30	753	8276	9059
19.	"	3D2B1j	--	--	--	--	1015	1535	6142	8692
20.	"	3D2B1k	--	--	--	--	65	1675	4675	6415
Total			--	--	**664**	**231**	**2447**	**6649**	**44776**	**54767**
21.	Chamu River	3D2B2a	--	--	--	--	235	690	6493	7418
22.	"	3D2B2b	--	--	--	--	--	1154	2885	4039
23.	"	3D2B2c	--	--	--	--	195	1661	4840	6696
24.	"	3D2B2d	--	--	112	--	327	1570	9962	11971
25.	"	3D2B2e	--	--	--	--	--	592	8175	8767
26.	"	3D2B2f	--	--	35	--	--	54	6566	6655
27.	"	3D2B2g	--	--	250	--	--	371	5626	6247
28.	"	3D2B2h	--	--	--	--	25	530	7175	7730
29.	"	3D2B2j	--	--	--	--	--	647	7360	8007
30.	"	3D2B2k	--	--	--	--	170	902	7091	8163

31	"	3D2B2*l*	--	--	--	--	--	612	5589	6201
Total			--	--	**397**	--	**952**	**8783**	**71762**	**81894**
32.	Taret river	3D2B3b	--	--	--	--	--	2944	2826	5770
33.	"	3D2B3d	--	--	--	--	--	795	3030	3825
34.	"	3D2B3e	--	--	--	--	--	56	2107	2163
35.	"	3D2B3F	--	--	--	--	--	725	1597	2322
Total			--	--	--	--	--	**4520**	**9560**	**14080**
36.	Tuyungbi Maklang	3D2B4a	--	--	--	--	575	825	5111	6511
37.	"	3D2B4b	--	--	--	--	--	1050	5490	6540
38.	"	3D2B4c	--	--	--	--	--	2275	9215	11490
39.	"	3D2B4d	--	--	--	--	--	1752	10850	12602
40.	"	3D2B4e	--	--	--	--	--	1332	8050	9382
41.	"	3D2B4f	--	--	--	--	--	450	3740	4190
42.	"	3D2B4g	--	--	--	--	--	445	10748	11193
43.	"	3D2B4h	--	--	--	--	--	2476	6578	9054
44.	"	3D2B4j	--	--	--	--	--	1872	7796	9668
45.	"	3D2B4k	--	--	--	--	195	1285	9835	11315
46.	"	3D2B4*l*	--	--	--	--	--	1215	7812	9027
47.	"	3D2B4*m*	--	--	--	--	--	567	5282	5849
48.	"	3D2B4n	--	--	--	--	--	1312	10102	11414

49.	"	3D2B4p	--	--	--	--	--	900	3092	3992
Total			--	--	--	--	**770**	**17756**	**103701**	**122227**
50.	Maklang Nagayal	3D2c5a	--	--	--	--	497	2650	7201	10348
51.	"	3D2c5b	--	--	--	--	--	1475	4872	6347
52.	"	3D2c5c	--	--	--	--	--	--	868	868
Total			--	--	--	--	**497**	**4125**	**12941**	**17563**
53.	Khunukhong Sanalok	3D2B6a	--	--	--	--	--	2495	7255	9750
54.	"	3D2B6b	--	--	--	--	175	1675	7790	9640
55.	"	3D2B6c	--	--	--	--	--	185	7932	8117
56.	"	3D2B6d	--	--	--	--	--	772	5500	6272
57.	"	3D2B6e	--	--	--	--	--	950	10926	11876
58.	"	3D2B6f	--	--	--	--	--	2135	7127	9262
59.	"	3D2B6g	--	--	--	--	--	635	8442	9077
60.	"	3D2B6h	--	--	--	--	365	2515	8680	11560
61.	"	3D2B6j	--	--	--	--	--	1237	12168	13405
Total			--	--	--	--	**540**	**12599**	**75820**	**88959**
Total Ukhrul			--	**1,174**	**1,726**	**346**	**6465**	**73975**	**370714**	**454400**

From table 4.10 it is observed that the maximum area i.e., 81.58 per cent lies in the very steep slope category followed by 16.28 per cent which lies in moderately steep to steep slope category and 1.43 per cent falls in the strongly sloping category. Negligible area i.e. about 0.71 per cent falls in the categories of moderately, gently and very gently sloping land.

By and large *jhum* cultivation is practised in the hilly areas having gentle slopes, high rainfall, moderate temperature and good soil which favours quick growth of plants. The results so far has shown that in Ukhrul district nearly 81.58 per cent of land is having very steep slope and 16.28 per cent of the total land is having moderately steep to steep slope. In spite of the above facts regarding the slope, 35.77 per cent of the total area is under *jhum* cultivation in Ukhrul district. This shows that steep slopes do not prevent the tribals from practising *jhum*.

Despite the fact that steep slope is more hazardous from the point of soil degradation and intensive labour use, the very steep slope and moderately steep to steep slope areas (98%) of Ukhrul district is also under heavy pressure of *jhum* cultivation due to increasing population. With abandoning the *jhum* sites for soil reasons, *jhumias* are bound to practise even in very steep slope and difficult terrain.

CHAPTER – V

SOCIO-ECONOMIC CONDITIONS OF *JHUMIA*S IN UKHRUL DISTRICT

In Ukhrul district *jhuming* is a way of life. Field work conducted in Ukhrul district showed that *jhuming* evolved due to the physiographical character of land under the sub-tropical ecosystems of monsoon climate. It is practised for livelihood. The climate, terrain, food habits, needs, self-reliance, foiklores, festivals, and overall cultural ethos have a say in *jhum*. This low input and low output but labour intensive cultivation system was regarded good in the early times when there was scattered population. But now pressure of population on *jhum* is increasing gradually and per capita land has decreased proportionately. This scenario poses a threat on sustainability of agricultural land. Pressure of population makes the *jhum* cycle shorten. This is associated with further low production due to immature soil conditions. Thus, population pressure plays a vital role in deciding the landuse pattern as well as the socio-economic conditions of the people.

In this chapter an attempt has been made to study the socio-economic conditions of the *jhumias* in Ukhrul district. Data for assessing the socio-economic conditions of the *jhumias* were drawn from a comprehensive survey of 5 villages, each lying in different tribal development blocks (fig. 5.1), with the help of questionnaire interviews (Appendix 1). While selecting the 5 villages, it was kept in mind that these villages were a good representation of *jhumias* belonging to different tribal development blocks in Ukhrul district. About 8 to 21 households were sampled from every village. From the village Lungphu situated in Phungyar Phaisat T.D. block 8 jhumia

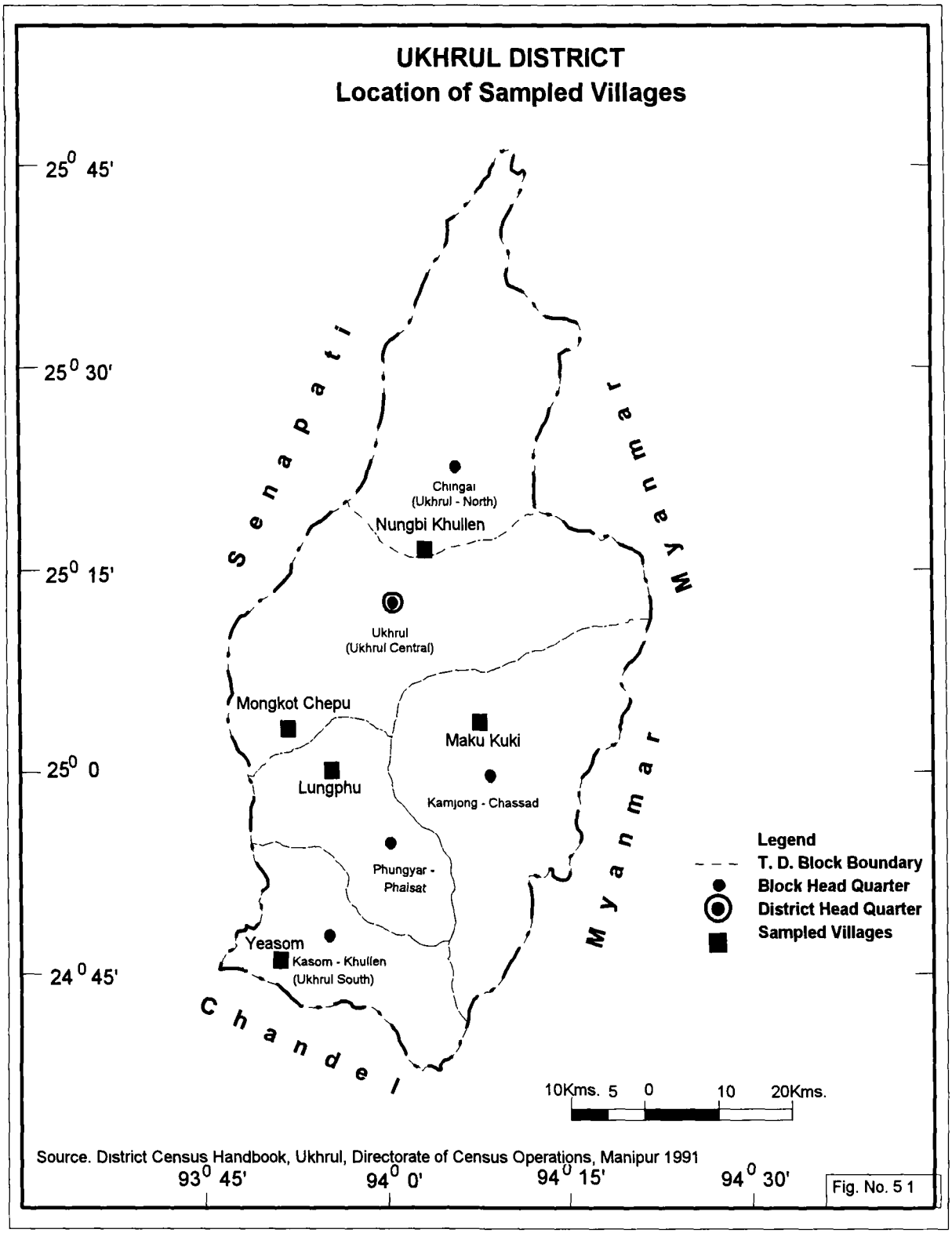
households were sampled. From the village Yeasom situated in Kasom Khullen T.D. block, 8 jhumia households were sampled. From the village Nungbi Khullen situated in Chingai T.D. block 21 jhumia households were sampled. From the village Mongkot Chepu situated in Ukhrul T.D. block 12 jhumia households were sampled. From the village Maku Kuki situated in Kamjong Chassad T.D. block 6 jhumia households were sampled. Thus, from the whole of Ukhrul district which has 222 villages, 55 households were sampled. About 13 per cent sampling was done (Table 5.1 & fig. 5.1).

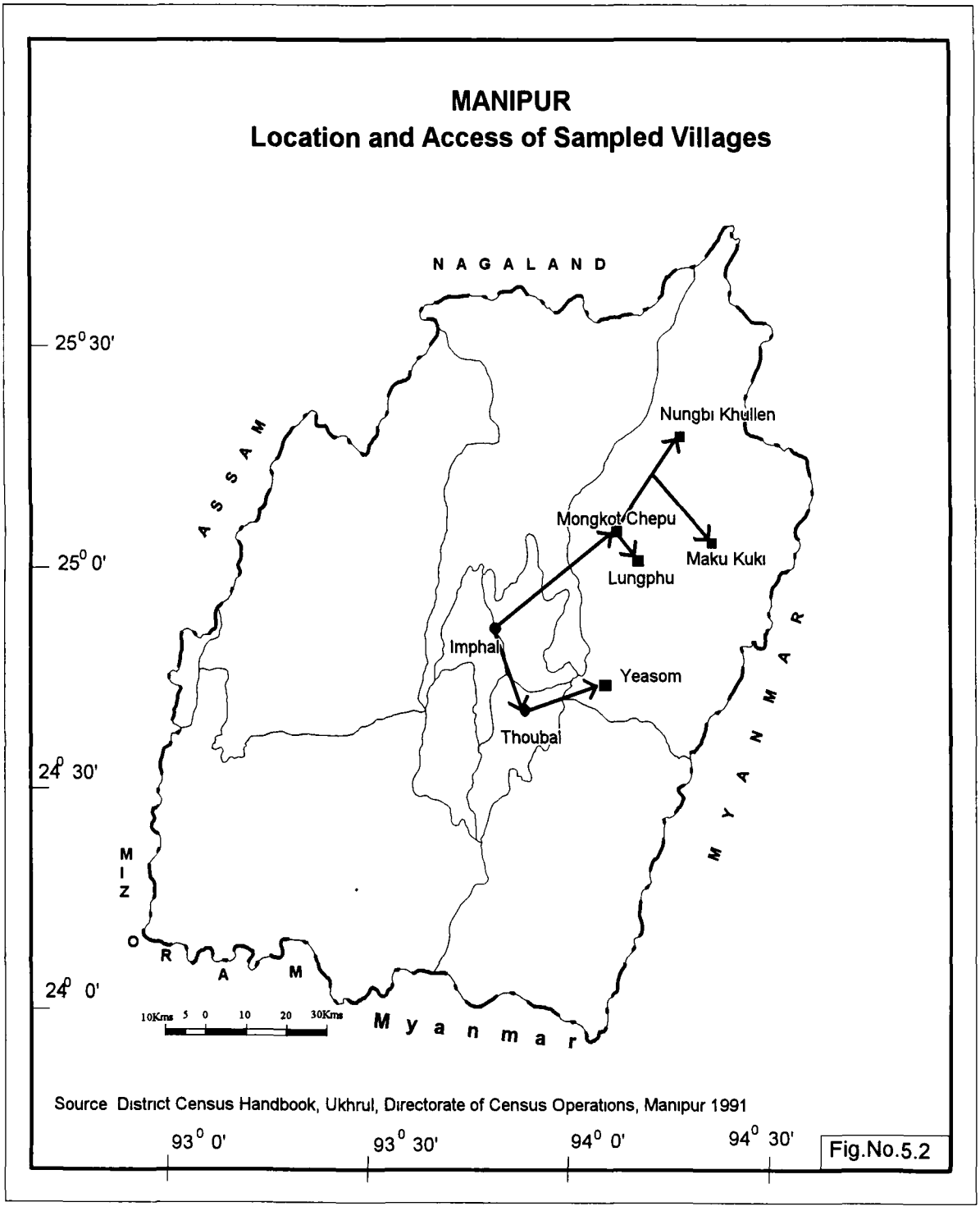
Table 5.1: Blockwise sampled villages and sampled households in Ukhrul district (2002)

S. No.	T.D. Block	Total number of villages	No. and Name of sampled village		Inhabitants/Tribals	Total No. of households in the village	Number of sampled households	% age of sampled households
1	Phungyar Phaisat	44	1	Lungphu	Tangkhul Naga	73	8	10.95
2.	Kasom Khullen	34	1	Yeasom	Tangkhul Naga	46	8	17.39
3.	Chingai	31	1	Nungbi Khullen	Tangkhul Naga	186	21	11.29
4	Ukhrul	64	1	Mongkot Chepu	Kuki	104	12	11.53
5.	Kamjong Chassad	49	1	Maku Kuki	Kuki	6	6	100
Total	Five Dev.Blocks	222	5	Five Villages Sampled		415	55 household sampled	13.25

Source: Based on Field Survey (2002)

Out of 222 villages only 5 villages have been sampled. This is due to inaccessibility, bad roads, lack of transport, difficult terrain, tribal population and insurgency. The author conducted the survey of the villages by foot and went around walking. Three of the sampled


UKHRUL DISTRICT
Location of Sampled Villages
25° 45'
25° 30'
25° 15'
25° 0
24° 45'
Senapati
Myanmar
Myanmar
Chandel
Chingai
(Ukhrul - North)
Nungbi Khullen
Ukhrul
(Ukhrul Central)
Mongkot Chepu
Maku Kuki
Lungphu
Kamjong - Chassad
Phungyar -
Phaisat
Yeasom
Kasom - Khullen
(Ukhrul South)
Legend
T. D. Block Boundary
Block Head Quarter
District Head Quarter
Sampled Villages
10Kms. 5 0 10 20Kms.
Source. District Census Handbook, Ukhrul, Directorate of Census Operations, Manipur 1991
93° 45'
94° 0'
94° 15'
94° 30'
Fig. No. 5 1


MANIPUR
Location and Access of Sampled Villages
NAGALAND
25° 30'
25° 0'
24° 30'
24° 0'
ASSAM
MIZORAM
MYANMAR
Nungbi Khullen
Mongkot Chepu
Maku Kuki
Lungphu
Imphal
Yeasom
Thoubal
10Kms 5 0 10 20 30Kms
Myanmar
Source District Census Handbook, Ukhrul, Directorate of Census Operations, Manipur 1991
93° 0'
93° 30'
94° 0'
94° 30'
Fig.No.5.2

villages namely, Nungbi Khullen, Lungphu and Yeasom are inhabited by Naga tribes and two namely, Mongkot Chepu and Maku Kuki by Kuki tribes. In every village more than 10 per cent random sampling of *jhumia* households have been conducted to assess their socio-economic conditions. This chapter is mainly based on primary data and Census 1991 data due to not availability of Census 2001 data.

5.1: Socio-economic conditions of the sampled *jhumias in* Lungphu Village

Lungphu village is located in the Phungyar - Phaisat tribal development block of Ukhrul district (fig. 5.1). It is about 50 km. away from the state capital Imphal. This village is situated at the peak of eastern range of Manipur Hills in the north - south *Purvanchal* at an altitude ranging between 1500-2000 meters above mean sea level.

This village is electrified, has a primary school and a *kuccha* road. The nearest market centre is at Litan which is about 15 kms away from the village. So the villagers have to go walking to avail the market and medical facilities. It takes them nearly 3 hours because of the rugged, hilly terrain and *kuccha* road. Another *kuccha* road links this village with Imphal-Ukhrul highway. This *kuccha* road is also about 15 kms long upto Lambui.

This village is inhabited by Tangkhul Naga tribes. They are labourious, courageous, sincere and hard working. Most of them are literate. Some of them had higher education. Tribal unity is their weapon. Agriculture, mainly *jhuming* is the mainstay of their economy.

Field surveys revealed that they are not only occupied in agriculture but they had other occupations also like business and government jobs.

According to 1991 Census, the total population of the village was 477 of which 256 are males and 221 females. Nearly 42 per cent of the total population are literate. The village has 73 households. So on an average 1 household has 6.5 persons. The economic classification of the population shows that of the total population, 43.4 per cent are main workers (115 males and 92 females) and 56.6 per cent are non-workers. Of the main workers, 84 per cent (83 males and 91 females) are cultivators and 16 per cent (32 males and 1 female) are involved in other services. There is no marginal worker in the village. More than half of the population are non-workers. This shows that either the population includes non-workable members or students.

5.1.1: Land Tenure

Field surveys revealed that both the village community and individual *jhumias* have separate rights on the *jhum* fields in Lungphu village. The *jhum* land were owned by individual *jhumias* and they could make any changes in their fields within the period of *jhum* practising and also within the period of *jhum* abandoning. Though the individual families have right in their own *jhum* field, but they do not have any right to sell any area of land within the village land. There is no question of selling and buying any area of *jhum* land. Individual families have to practise *jhum* in the same field where he did before *jhum* cycle. But they can not go for *jhum* cultivation in any separate

field from the site where the whole community carried out *jhum*. This is the right of the whole community under the leadership of the village head man to decide as to where they should go for *jhum* in the current year. The village community does the selection of site for *jhum*. In every selected site, each family has their permanent *jhum* field. So, families are bound to practise *jhum* in their own fields at the same selected site.

As far as terrace fields are concerned, there is no community ownership system. Terraced fields basically belong to individual families. Any changes in one's field is the right of the owner and he has to take his own decision.

5.1.2: Cropping period and *jhum* cycle:

Usually in *jhum*, the cropping period varies from place to place and it ranges between 2 to 3 years. But field observations showed that in Lungphu village, the cropping period is of one year and then the field is abandoned.

In this village, in one year cropping, there is no crop rotation because the farmers cultivate a particular *jhum* field for one year only with paddy as the main crop. Then they leave the place and move to another *jhum* site in the next year. So, there is no question of crop rotation. Paddy is the main food crop grown followed by maize, chillies, ginger, turmeric, garlic, coriander, mustard leaves, potato, arum, cabbage, cauliflower onion, brinjal, sesamum, pea, bean, banana etc.

In the *jhum* fields, traditional varieties of crops are grown with dibbling method. Mostly single crops are grown in the *jhum* fields. Rain is the only source of water for these fields. There are no irrigation facilities. Modern advanced methods like the use of high yielding varieties of seeds, manures, fertilizers, pesticides and insecticides are not used in the *jhum* fields.

In one year cropping, the amount of soil lost is very meagre because the natural vegetation regenerates quickly and automatically. This controls soil erosion. In the cropping year also, villagers do not use big tools because this disturbs the soil structure. They use only small tools and implements like small spade for dibbling. This does not lead to soil losses.

During the early days when the population pressure was not much, 30 to 40 years of *jhum* cycle was adopted. So early *jhum* was considered to be as goods as farming. The production maintained the survival of early man easily and long *jhum* cycle gives the hills ample of time to recuperate soil through natural process. Now, due to heavy population pressure on land, the cycle of *jhum* has decreased and it has become only 3 to 4 years. These figures differ from place to place and from time to time.

Field observations showed that in Lungphu village, 15 years *jhum* cycle still exists. The soil lost in one-year cropping could easily recuperate within this 15 year *jhum* cycle. The area available with this village is very big though the accurate figures are not available. With

the availability of land, this village has an adequate *jhum* land and it makes *jhum* cycle long.

5.1.3: Man-land ratio:

As far as the man-land ratio is concerned, it is interesting to note that figures pertaining to land and production are not very accurate. Unit system used for the measurement of area of land like acres and hectares is not used. The researcher with the help of experienced village persons had to determine the area of the land on the basis of production.

Tin preferably the mustard oil tin is used for measuring productions. This tin has a capacity of 15 kgs of paddy which gives 7 kgs. of rice. So approximately in one *Sangam* (a local land unit system used which is roughly equal to 0.62 acre), *jhumias* sowed upto two tins of paddy to get a production of more or less 70 tins of paddy. Thus, if in an area, more than 1 tin of paddy is sown and nearly 70 tins of paddy is produced which is equivalent to 1,050 kgs. of paddy, the area is considered to be equal to 1 *sangam*.

Different crops have different production figures. Rice is the main food crop and it occupies 90 to 95 per cent of the total available land. In the permanent valley wet cultivation, the production of paddy is twice or more than *jhum* based production. The figures of production on terraced filed is also nearly same with the valley cultivation if irrigation and fertilizers are used.

Eight households were sampled. Table 5.2 shows the distribution of the sampled households according to ownership of *jhum*, terraced land, man-land and man-*jhum* land ratio in Lungphu village. The total population of the sampled households is 67 and the available *jhum* land and terraced land are 14.86 acres and 3.62 acres. The total land area of sampled households is 18.48 acres. Thus, the average man-land ratio of the village is 1:0.28. The available *jhum* land in sampled households is 14.86 acres and is owned by only 7 households. One household does not practise *jhum*. In the 7 households, 58 persons live. Thus the average man-*jhum* land ratio is 1:0.26.

Table 5.2: Distribution of sampled households according to ownership of *jhum*, terraced land, man-land and man-*jhum* land ratio in Lungphu village of Ukhrul district (2002)

S. No.	House No.	Total No. of Persons	Terraced land	*Jhum* land	Total land	Percentage of the total land		Man-land ratio	Man-*jhum* land ratio
			(In acres*)			Terraced	*Jhum*		
1.	37	6	--	3.72	3.72	--	100.00	1:0.62	1:0.62
2.	46	10	1.24	0.62	1.86	66.67	33.33	1:0.19	1:0.06
3.	48	6	0.62	0.62	1.24	50.00	50.00	1:0.21	1:0.10
4.	49	9	--	3.70	3.70	--	100.00	1:0.41	1:0.41
5.	56	9	0.62	1.24	1.86	33.33	66.67	1:0.21	1:0.14
6.	55	7	0.21	2.48	2.69	7.81	92.19	1:0.23	1:0.35
7.	53	11	--	2.48	2.48	--	100.00	1:0.23	1:0.23
8.	66	9	0.93	--	0.93	100.00	--	1:0.10	--
Total		67	3.62	14.86	18.48	19.59	80.41	1:0.28	1:0.26

Note:* Since the land figures are very small, it has not been converted into hectares.

Source: Based on Field Survey (2002)

Table 5.3 is showing the distribution of sampled households on the basis of type of agriculture practised i.e., whether it is *jhum* (with or without terraced) or terraced (with or without *jhum)* or only *jhum*, or only terraced, or both categories together. Overlapping in types of agriculture practised was observed. It is seen that out of the total sampled (8) households in Lungphu village, 87.50 per cent households are practising *jhum* with or without terraced, 62.50 per cent household are practising terraced with or without *jhum*, 37.50 per cent households are practising only *jhum*, 12.50 per cent households are practising only terraced and 50 per cent households are practising both *jhum* and terraced.

Table 5.3: Distribution of sampled households practising *jhum*/ terraced/both categories in Lungphu village of Ukhrul district (2002)

S. No.	Category	No. of Households	Percentage of Sampled Households
1.	No. of households surveyed	8	100.00
2.	No. of household practising *jhum* (with or without terraced)	7	87.50
3.	No. of households practising terraced (with or without *jhum*)	5	62.50
4.	No. of households practising only *jhum*	3	37.50
5.	No. of households practising only terraced	1	12.50
6.	No. of households practising both categories	4	50.00

Source: Based on Field Survey (2002).

Three sampled households (37.50 per cent) had 100 per cent of the area under *jhum*. While 1 sampled household had nearly 93 per cent

of the area under *jhum*, 2 households had 50 to 70 per cent of the area under *jhum*, and 1 household had nearly 34 per cent of land under *jhum*. So 7 households i.e., 87.50 per cent of the total sampled households, were practising *jhum*.

5.1.4: Labour-Production Ratio:

Work force (persons working in *jhum*) and total earning of different sampled households in Rs. from *jhum* land was taken into consideration to know the labour-production ratio. During the field survey *jhumias* reported that they cultivated mainly paddy and some other food and cash crops in little amount. The production of paddy is approximately 70 tins per *Sangam* which is equal to 7 kgs of rice per tin after grinding. The average cost of one kg of rice is Rs. 12.00, though the figure ranges from Rs. 10 to Rs. 15. If this is further calculated at this rate it works out as following,

1 tin of paddy = 7 kgs of rice

1 *Sangam* = 70 tins of paddy = 490 kgs of rice.

Cost of rice will be 490x12 = Rs. 5,880 from one *Sangam*. The amount of production of other crops cannot be done because accurate production figures are not known. Respondents reported that upto Rs. 2,000/- is earned from these crops by each family who practise *jhum*. Table 5.4 is showing the labour-production ratio in *jhum* cultivation in the sampled households. Thus, on an average one labour is earning Rs. 4,514 in a year from the *jhum* field.

Table 5.4: Distribution of sampled households according to the labour-production ratio in *jhum* cultivation in Lungphu village of Ukhrul district (2002).

S. No.	House No.	Total No. of Persons	In *Jhum*		Production of rice in *jhum*		Earning from other crops (in Rs.)	Total earning from *jhum* (In Rs.)	Ratio
			Person working	Percentage to the total persons	In Kgs	In Rs.			
1.	37	6	4	66.67	3,150	37,800	1,200	39,000	1:9750
2.	46	10	7	70.00	560	6,720	1,280	8,000	1:1142
3.	48	6	5	83.33	560	6,720	1,280	8,000	1:1600
4.	49	9	6	66.67	3,150	37,800	2,200	40,000	1:6666
5.	56	9	4	44.44	1,050	12,600	1,400	14,000	1:3500
6.	55	7	3	42.86	2,100	25,200	1,800	27,000	1:9000
7.	53	11	6	54.55	1,750	21,000	1,000	22,000	1:3666
8.	66	9	--	--	--	--	--	--	--
Total		67	35	60.34	12,320	147,840	10,160	158,000	1:4514

Note: 1. The production of rice has been converted into money value on the basis of current price of rice. 1kg of rice costs Rs. 12 (2002). The money value of other crops as reported has also been added.

2. 1$≃ 49 Indian Rupees, 1£ ≃ 76 Indian Rupees, 1 Euro≃50 Indian Rs.

Source: Based on Field Survey (2002)

A perusal of table 5.4 shows that in the sampled households of Lungphu village the total production of rice is 12,320 kgs and the total earning is Rs. 158,000 from the *jhum* fields. The labour-production ratio is 1:4514. There were three families who were practising only *jhum*. Their labour-production ratio worked to be 1:9750, 1:6666 and 1:3666. Their average yearly earning from *jhum* field is Rs. 33,666 and average labour-production ratio is 1:6694. One family (S.No. 8, 12.50 per cent of the total household) is not practising *jhum*, therefore no calculations have been made.

5.1.5 : Resultant Socio-Economic Conditions

We all know that *jhum* is simply subsistence agriculture. Field observations have revealed that the production from *jhum* as well as terraced land in Lungphu village is sufficient for the village consumption. At present there is no alarming situation of food scarcity. But as the tribal population grows food scarcity will appear and this will have an impact on the socio-economic condition of the *jhumias*.

During the field survey some respondents reported that this traditional way of practising cultivation system was giving low yields. It is labour intensive cultivation system i.e., villagers have to work throughout the year and the returns were very poor. This leads to hunger and starvation. The villagers involved in *jhum* are unable to support their families and send their children away for higher education.

Other drawback observed in this village is lack of accessibility. Due to rugged and hilly terrain transport system cannot be developed. Roads are *kuccha* with potholes. Thus, *jhum* is a way of life for this village unless the government comes up with financial support and future positive plans. The villagers have the idea of better cultivation systems and they are willing to bring changes in *jhum* fields to increase production and also not to disturb the ecosystem, if situation prevails. But they don't have any means to bring these changes without any outside support.

As far as the production from the *jhum* fields is concerned, it is only about half or less than half of wet valley permanent cultivation. For this little production for subsistence, people have to work intensively throughout the year. Beginning from January, they start the selection of *jhum* site followed by cutting down the *jungles*, burning down the dried biomass into ashes, preparing fields for crops, sowing by dibbling method, weeding and protecting of crops, harvesting and storing. All these systematic processes of *jhum* cultivation starts from January and is carried on upto October. They get only about 2 months free time in which they celebrate feasts, marriages, festivals, functions, games and sports etc. In the next year, again starting from January, they are absorbed in the processes of *jhum* cultivation.

Thus, these traditional based cultivation system does not support any progress in lifestyle. *Jhumias* remain poor economically and are not in touch with the developed modern lifestyles. They have sociological boundness within their traditional lifestyle. Providing motorable *pucca* transport road with facilities of public service vehicles and some basic essential amenities and facilities like communication facility, education facility etc. are a part of initial way to bring this Lungphu village economically viable and sociologically progressive.

5.2: Socio-economic conditions of the sampled *jhumias* in Yeasom village:

Yeasom village, which was part of Khoripok Mathak village in 1991 Census, was separated and established as a separate village under

the name 'Yeasom'. The remaining separate village still holds the former name-Khoripok Mathak. Yeasom village is located in the Kasom-Khullen tribal development block of Ukhrul district (fig. 5.1). It is about 50 kms away from Imphal via. Thoubal and about 20 kms from Yairipok. Yairipok is the nearest main market centre. This village is situated at the top hill slope near the peak of southern most hills of Ukhrul district, bordering with Senapati and Thoubal districts. The altitude of this village is not known but is about 1,500 meters above mean sea level in the eastern range of Manipur hills extending north-south.

This village is also inhabited by Tangkhul Nagas who have the same characteristics with the Tangkhuls of Lungphu village. Tangkhul Naga peoples are generally labourious, courageous, sincere, boldness, hardworking and hospitable. Agriculture, mainly *jhum* is the main occupation of the people of this village. Terraced cultivation is practised at the foothills. Collecting woods from forest and selling it to the market for fuel and timber purpose is another occupation of the villagers. Moreover, the people of this village are in touch with the valley people to great extent. They interact and co-operate with them.

This village is connected with transport system. Only one bus service is available in a weak. The very bad condition *pucca* road, which connects this village with other valley region, is extending upto Ukhrul via, Kasom Khullen. Though this village is within Ukhrul district, the villagers are not in touch with Ukhrul district headquarter in daily life. They are in touch with valley dwellers and valley market

centres like Yairipok and Imphal. Yairipok is the main and nearest market centre. There are also some other small markets in between Yeasom village and Yairipok. The nearest one is about 10 kms from Yeasom village. For catching a bus for daily life purpose, villagers have to come upto foothill from where buses are available daily.

The population figures are not available officially for separate Yeasom village as this village was with Khoripok Mathak in the Census year. One villager who holds an important post in the village administration reported that there were 30 households with 170 persons in Yeasom village in 1991. Official Census report provides combined data for these two villages - Yeasom and Khoripok Mathak. According to 1991 Census, total population of the village was 239. Of which 116 are males and 123 females. More than 43 per cent of the total population are literate. This village has 46 households. So, on an average one household has 5.2 persons. The economic classification of the population shows that of the total population, 53.97 per cent are main workers (62 males and 67 females) and 46.03 per cent are non-workers. Of the main workers, 95.35 per cent (56 males and 67 females) and 46.03 per cent are non-workers. Of the main workers, 95.35 per cent (56 males and 67 females) are cultivators and 4.65 per cent (6 males only) are engaged in other services.

5.2.1 : Land Tenure

In contrast to the community ownership of land in *jhum*, field survey revealed that there was individual ownership of *jhum* land in

Yeasom village. Like in Lungphu village, *jhumias* have to practise *jhum* in the same area where he did before *jhum* cycle. It is his (individual *jhumias*) right of any changes in his field with his own decision. But there is a boundness of practising *jhum* in the same selected site for a particular year. It is under the final decision of the village community to choose a suitable *jhum*. After selecting the *jhum* site, individual families have to practise *jhum* on their already marked *jhum* field. If the area of *jhum* of an individual *jhumia* is small and not enough to feed his family members, he could demand for more *jhum* land to practise. Holding of *jhum* land is totally based on need and availability of working force.

Terraced field and wet cultivation field in valley are totally individual ownership. There is no community right in these matters. Whatever changes in ones field is under his or her own decision without any external influence.

5.2.2: Cropping Period and *Jhum* Cycle

Field surveys revealed that the crops sown in the Yeasom village are traditional. The *jhumias* attempt to grow all the crops he needs for his family. Such a subsistence cropping pattern is based on the utilization of inherent fertility of the soil without using modern agricultural inputs and technology like high yielding varieties, irrigation, fertilizers, pesticides and insecticides etc.

When selecting a *jhum* site in a particular year, soil texture, colour and structure of soil, steepness of slope etc. are taken into consideration. Elder *jhumias* with their experience and ideas simply observed the characteristics of soil with their necked eyes in the field itself. So, soil and fertility of soil are the matters of concern in *jhum*.

Filed observations showed that only one year cropping is done in this village also for soil reason. One year cropping has obviously, less loss of soil in comparison with 2 or 3 years continuous cropping. *Jhumias* are manual workers and their work on *jhum* depends on small tools and implements which does not disturb the soil. After one year cropping, the *jhum* field is left for recuperating soil loss through natural way. There is no crop rotation in one year *jhum*.

Paddy is the main food crop grown in the *jhum* fields. About 90 per cent of the total *jhum* land is occupied by paddy. Maize is another important crop followed by chillies, ginger, turmaric, coriander, mustard leaves, potato, arum, cabbage, cauliflower, brinjal, sesamum, pea, arhar, soyabean, lemon, *papaya*, banana, lady finger etc. Rain is the only source of water for *jhum* cultivation. No other irrigation facilities are available. In terraced or wet valley cultivation some kind of irrigation from canals, rivers and from small channels from rivers is available.

After one year *jhum* practise, *jhumias* of Yeasom village abandoned the area for 9 to 10 years. This period of abandoning the *jhum* field is known as *jhum* cycle. This 9 to 10 years *jhum* cycle is not

so short because there is only one year cropping. Soil loss in one year cropping comes again in 10 years *jhum* cycle as this period is enough to regenerate natural vegetation.

5.2.3: Man-land Ratio

Field study showed the same situation existed in Yeasom village. People generally don't know the area of *jhum* in terms of acres or hectares. Area has to be calculated approximately based on production. One area in hill slope where 1 to 2 tin of paddy used to saw and roughly about 70 tin of paddy is produced then the area is estimated as one '*Sangam*' (a local land unit system) which is approximately equal to 0.62 acre.

Table 5.5: Distribution of sampled households according to ownership of *jhum*, terraced land, man-land and man-*jhum* land ratio in Yeasom village of Ukhrul district (2002)

S. No.	House No.	No. of Persons	Terraced land	*Jhum* land	Total land	Percentage of the total land		Man-land ratio	Man-*jhum* land ratio
			(In acres*)			Terraced	*Jhum*		
1.	23	5	--	2.22	2.22	--	100.00	1:0.44	1:0.44
2.	2	6	--	2.66	2.66	--	100.00	1:0.44	1:0.44
3.	32	4	1.77	--	1.77	100.00	--	1:0.44	--
4.	10	5	--	1.06	1.06	--	100.00	1:0.21	1:0.21
5.	8	10	2.13	0.62	2.75	77.45	22.55	1:0.27	1:0.06
6.	6	7	0.49	1.24	1.73	28.32	71.68	1:0.25	1:0.18
7.	15	7	--	1.33	1.33	--	100.00	1:0.19	1:0.19
8.	14	4	--	1.68	1.68	--	100.00	1:0.42	1:0.42
Total		48	4.39	10.81	15.20	28.88	71.12	1:0.32	1:0.25

Note: * Since the land figures are very small, it has not been converted into hectares.

Source: Based on Field Survey (2002)

Table 5.5 is showing the distribution of sampled households according to ownership of *jhum*, terraced, man-land and man-*jhum* land ratio in Yeasom village. Among 46 households of the village, 8 households have been sampled. It is more than 10 per cent random sampling. Calculation is done to find out the area under cultivation based on 70 tin of paddy per *Sangam* for *jhum* field and 140 tin of paddy per *Sangam* for terraced field. It is not an easy task to determine the area owned by particular households and so the figures of land area is not very accurate. Out of 8 households sampled, a total of about 4.39 acres of terraced land is available in the three households. Another 10.81 acres of *jhum* land is also available in the seven households. One household does not practice *jhum*.

Table 5.6: Distribution of sampled households practising *jhum*/terraced/both categories in Yeasom village of Ukhrul district (2002)

S.No.	Category	No. of Households	Percentage of Sampled Households
1.	No. of households surveyed	8	100.00
2.	No. of household practising *jhum* (with or without terraced)	7	87.50
3.	No. of households practising terraced (with or without *jhum*)	3	37.50
4.	No. of households practising only *jhum*	5	62.50
5.	No. of households practising only terraced	1	12.50
6.	No. of households practising both categories	2	25.00

Source: Based on Field Survey (2002).

Thus, a total of 15.20 acres of land (both *jhum* and terraced) are available in 8 sampled households. Total number of persons in the

sampled households are 48 and the average man-land ratio is 1:0.32. As far as only man-*jhum* land is concerned, there is an average ratio of 1:0.25 in the village, though the figures differ from house to house.

Table 5.6 is showing the distribution of sampled households practising *jhum*/ terraced/ both categories in Yeasom village. Overlapping is observed in this table. It is observed that out of the total sampled households of the village, 87.50 per cent households are practising *jhum* with or without terraced, 37.50 per cent households are practising terraced with or without *jhum*, 62.50 per cent households are practicing only *jhum* and 12.50 per cent households are practising only terraced cultivation while 25 per cent of the total households are practising both categories.

Five sampled households (62.50 per cent of the total households sampled) had 100 per cent *jhum*, one household had more than 71 per cent of the total area under *jhum* and another household has about 22 per cent of the total area under *jhum*. Thus, seven households i.e. 87.50 per cent of the total households were practising *jhum*. One household among 8 sampled households has 100 per cent terraced land while another two households had about 77 per cent and 28 per cent terraced land of the total land available.

5.2.4: Labour-Production ratio

Availability of work force (persons working in *jhum*) in a particular households and total approximate earning from *jhum* field

are taken into consider to know the labour-production ratio. In *jhuming* manual labour is the main input. There are no machines or technology except little tools and implements. So work force is taken as the only labour involved.

Table 5.7: Distribution of sampled households according to the labour-production ratio in *jhum* cultivation in Yeasom village of Ukhrul district (2002)

S. No.	House No.	Total No. of Persons	In *Jhum*		Production of rice in *jhum*		Earning from other crops (in Rs.)	Total earning from *jhum* (in Rs.)	Ratio
			Person working	Percentage to the total persons	In Kgs	In Rs.			
1.	23	5	2	40.00	1,750	21,000	1,000	22,000	1:11000
2.	2	6	4	66.67	2,100	25,200	800	26,000	1:6500
3.	32	4	--	--	--	--	--	--	--
4.	10	5	2	40.00	840	10,080	920	11,000	1:5500
5.	8	10	4	40.00	490	5,880	620	6,500	1:1625
6.	6	7	2	28.57	980	11,760	740	12,500	1:6250
7.	15	7	2	28.57	1,050	12,600	900	13,500	1:6750
8.	14	4	2	50.00	1,330	15,960	540	16,500	1:8250
Total		48	18	37.50	8,540	102,480	5,520	108,000	1:6000

Note: 1. The production of rice has been converted into money value on the basis of current price of rice. 1kg of rice costs Rs. 12 (2002). The money value of other crops as reported has also been added.
2. 1$≃ 49 Indian Rupees, 1£ ≃ 76 Indian Rupees, 1 Euro≃50 Indian Rs.

Source: Based on Field Survey (2002)

Calculation is done at the rate of Rs. 12 per kg. of rice. A sum of about Rs. 1,000 is also earned from the production of other crops by each *jhum* practising family.

A perusal of table 5.7 shows that in the sampled households of Yeasom village, the total production of rice is 8,540 kgs. and total earning is Rs. 108,000 from the *jhum* fields. The average labour-production ratio is 1:6000. But the ratio differs from house to house. It is also observed that the ratio between labour and production is high in the households who are doing only *jhum.* All their earnings are from *jhum* field while in the families who are doing both *jhum* and terraced, the ratio is low because the earnings from terraced fields have not been calculated.

Requirement of labour in terms of hours for *jhum* operations and cultivation of crops per acre is not known. But it is obviously true that if one household has only 2 work force and 2.5 acre of *jhum* land, then it may not be possible to practise *jhum* in the available land with inadequate working force. In this case, *jhumia* families have to hire other labour from relatives and villagers to do *jhum* in their field. Hiring charges are not paid in terms of money but payed in terms of labour. If one labour is hired for 5 days, then the *jhum* holder has to work for 5 days in the *jhum* field of the hired labourer. Sometimes widows and other women labourers are paid with food grains. Different crops have different labour requirements. Operations of *jhuming* and requirements of labour may differ from one field to another field of same size because of the type of vegetation cover, slope gradient, distance from the village and soil conditions of the *jhum* fields.

5.2.5: Resultant socio-economic conditions

Although some other basic occupations supported to *jhum* based lifestyle, the life of *jhumias* of Yeasom village is still traditional perhaps due to their dependence on *jhum*. For *jhum* cultivation, they have to work year long. It is labour intensive and hard work is needed but it does not give any surplus production so as to enable the villagers to support their life in progressive way. Big family size becomes an asset to the *jhumias*.

Jhumias do not care about the soil degradation in their *jhum* fields. They don't apply any traditional or advanced method to conserve soil because of short cropping period. After one year cropping, *jhumias* leave their field and abandoned it for natural recuperation of soil through regeneration of natural vegetation. More or less soil lost in one year cropping is regenerated in 10 years *jhum* cycle. From the point of *jhumias* doings, it is known that this natural regeneration of fertility of soil in *jhum* filed is more important than any other artificial soil conservation method. Belonging of land to individual *jhum*ia in this village is not same with the valley ownership system. Although land belongs to individual family, the supreme authority of this *jhum* land is the village community as a whole.

The average *jhum* land per head in this village is 0.25 acre and it is little bit low from the point of production. Only about 200kgs. of rice is available from 0.25 acre of *jhum* land at the rate of 70 tin of paddy per *sangam* (0.62 acre). This 200kgs of rice is not enough for

one's survival for a year. The life of *jhumias* in Yeasom village is not in a progressive one. But due to interactions with the valley dwellers and valley activities the *jhumias* have more scope to choose. Applying traditional and advanced type of soil conservation measures in *jhum* fields and more interactions and cooperation in earnings with valley people are important steps to overcome the problems of the village. Basic amenities and facilities should be provided. Alternative more productive cash crops should be applied in *jhum* fields to earn more money.

5.3: Socio-economic conditions of sampled jhumias in Nungbi Khullen Village

Nungbi Khullen village is located in Chingai tribal development block of Ukhrul district (fig. 5.1). It is about 120 km. away from Imphal and 40 km. from Ukhrul (district headquarter). This village is situated at the peak of the one of the highest hill range of Manipur having an altitude ranging between 2,000-2,500 metres above mean sea level along the Ukhrul-Jessami road.

This village has the facility of transport with one or two buses going upto Ukhrul in daily life. Ukhrul is an important nearest market centre.

The tribes inhabiting the village are Tangkhul Naga who have progressive lifestyle. They are labourious, hard working and hospitable. Though road transport is available, farness from central plain of Manipur avoid any interactions with valley dwellers and valley

activities. The main occupation of this village is agriculture. Both terraced and *jhum* cultivation is practising in the village. Organisational work like NGO's and local youth club are boosting up the minds of villagers and their traditional life style is converting towards progressive life by adopting terraced cultivation and horticulture.

According to 1991 census, total population of the village was 985 of which, 494 were males and 491 females. Nearly 36 per cent of the total population are literate. This village has 186 households. On an average, 1 household has 5.3 persons. The economic classification of the population shows that of the total population, 43.86 per cent are main workers (205 males and 227 females). Of the main workers, 92.36 per cent (175 males and 224 females) are cultivators, 0.23 per cent are engaged in livestock, forestry, fishing, hunting and plantations orchards and allied activities, 0.23 per cent are engaged construction, 0.93 per cent are engaged in trade and commerce, 0.23 per cent are engaged in transport, storage and communication and 6.02 per cent are engaged other services. About 0.20 per cent of the total population are marginal workers while 55.94 per cent of the total population are non-workers.

5.3.1: Land Tenure:

Like in other Tangkhul Naga villages surveyed, this village has also individual ownership system in *jhum* field. Field survey revealed that the *jhum* land belongs to individual family and it is individual

jhumias right to bring any changes in his field with his own decision. There is no tenancy system. Selection of *jhum* site is done with the final decision of the village community under the leadership of village headman. In this village, headman is entitled as village chairman and not as king. *Jhumias* could have the *jhum* land as much as they want according to need. The availability of work force and number of persons in the family are the factors for holding the size of *jhum* land.

Villagers are more emphasizing on terraced cultivation, as terraced fields are available. More or less each and every household has terraced fields. Although, they have terraced fields, they don't fully leave *jhum*. This may be due to inadequacy of terraced fields or *jhuming* as their way of life. In case of terraced field, individual farmer has its own right as the land totally belongs to him.

5.3.2: Cropping period and *jhum* cycle

The period of consecutive cropping and fallowing differs from tribe to tribe and area to area in Ukhrul district. However, the cropping periods of many Tangkhul Naga villages in this district are same. Villages of other tribe have different characteristics. In the early, it can not be said with authenticity that when the primitive *jhum* cultivators had to come back to the same plot because they had vast areas to move about. With the tremendous increase in population and depletion of soil fertility of *jhum* land in the present trend, *jhumias* have to survive in smaller areas. His world of *jhum* has become small which is becoming

increasingly smaller and he has been forced to move about in a narrow cycle.

Field observation shows that in Nungbi Khullen village, one year cropping is done. Once the complete harvesting is done probably in the month of October, they leave the field and abandoned it for 5-10 years *jhum* cycle. This large village having about 186 households and nearly 1,000 population finds difficult to move in one *jhum* site together and if they move together in one site, it covers a large area. It leads to short *jhum* cycle. Short *jhum* cycle is an indication of poor soil condition and low production. No modern agricultural input and technology like HYV, irrigation, fertilizers, pesticides and insecticides etc. are used in *jhum*.

There is no crop rotation in one year cropping in the village. Paddy is the main food crop grown of the village and is mainly cultivated in terraced fields where some kind of traditional irrigation is available. In *jhum* field, *jhumias* cultivated maize, millet, chillies, ginger, garlic, coriander, mustard leaves, potato, arum, cabbage, cauliflower, brinjal, pea, bean, soyabean, lemon, banana and carot etc.

5.3.3: Man-land ratio

It is a common problem in every *jhum* practising villages of Ukhrul district that people don't have the idea of land in terms of acre or hectare. Production is the only means to know the land area approximately in this village. Due to short *jhum* cycle, the production

of paddy in *jhum* field is estimated as 60 tin per *sangam* based on the idea of experienced *jhumias*. In case of terraced cultivation, production of paddy is 120 tin per *sangam*. Paddy is mainly cultivated in terraced fields while *jhum* is for other crops. However, paddy is also grown in *jhum* fields in little amount. Millet and maize are important crops in *jhum* field. Productions of these crops in jhum field are accurately not known. Villagers mentioned the approximate amount of production in terms of Rs. Due to the lack of information about production of other crops rather than paddy, the area under *jhum* is also not clear. But *jhumias* determined their own *jhum* land roughly in terms of *sangam* . *Jhumias* used to collect about Rs. 4,000 per *sangam* from crops grown in *jhum* field in a year. If one family used to earn Rs. 2000 from *jhum* field in a year, then it is determined that this particular family has half *sangam jhum* land.

Table 5.8: Distribution of sampled households according to ownership of *jhum*, terraced, man-land and man-*jhum* land ratio in Nungbi Khullen village of Ukhrul district (2002)

S. No.	House No.	Total No. of Persons	Terraced land	*Jhum* land	Total land	Percentage to the total land		Man–land ratio	Man *jhum* land ratio
			(in acres*)			Terraced	*Jhum*		
1	1	9	1.29	1.00	2.29	56.33	43.67	1:0.25	1:0.11
2	5	5	0.77	0.62	1.39	55.40	44.60	1:0.28	1:0.12
3	7	8	0.77	1.00	1.77	43.50	56.50	1:0.22	1:0.12
4	11	6	0.77	1.24	2.01	38.31	61.69	1:0.33	1:0.21
5	16	6	1.29	0.62	1.91	67.54	32.46	1:0.32	1:0.10
6	35	6	1.03	0.62	1.65	62.42	37.58	1:0.27	1:0.10
7	40	9	1.08	0.31	1.39	77.70	22.30	1:0.15	1:0.03
8	52	6	1.03	1.55	2.58	39.92	60.08	1:0.43	1:0.26
9	59	7	1.29	0.46	1.75	73.71	26.29	1:0.25	1:0.07
10	61	5	1.03	0.62	1.65	62.42	37.58	1:0.33	1:0.12

11	62	4	0.62	0.46	1.08	57.41	42.59	1:0.27	1:0.11
12	75	7	0.88	0.23	1.11	79.28	20.72	1:0.16	1:0.03
13	81	6	1.03	0.77	1.80	57.22	42.78	1:0.30	1:0.13
14	101	9	0.77	0.77	1.54	50.00	50.00	1:0.17	1:0.08
15	109	5	0.62	0.77	1.39	44.60	55.40	1:0.28	1:0.15
16	121	2	0.41	0.31	0.72	56.94	43.06	1:0.36	1:0.15
17	133	4	1.03	1.24	2.27	45.37	54.63	1:0.57	1:0.31
18	140	9	1.44	0.77	2.21	65.16	34.84	1:0.25	1:0.08
19	151	7	1.44	2.32	3.76	38.30	61.70	1:0.54	1:0.33
20	157	5	1.41	0.62	1.03	39.81	60.19	1:0.20	1:0.12
21	167	5	0.62	–	0.62	100.00	–	1:0.12	-
Total		**130**	**19.62**	**16.30**	**5.92**	**54.62**	**45.38**	**1:0.28**	**1:0.13**

Note: Since the land figures are very small, it has not been converted into hectares.

Source: Based on field Survey (2002)

Table 5.9: Distribution of sampled households practising *jhum*/terraced/both categories in Nungbi Khullen village of Ukhrul district (2002)

S. No.	Category	No. of households	Percentage of sampled households
1.	No. of household Surveyed	21	100.00
2	No. of household practising *jhum* (with or without terraced)	20	95.24
3	No. of household practising terraced (with or without *jhum*)	21	100.00
4	No. of household practising only *jhum*.	–	–
5	No. of household practising only terraced.	1	4.76
6	No. of household practising both category.	20	95.24

Source: Based on Field Survey (2002)

Table 5.8 is showing the distribution of sampled households according to the ownership of *jhum*, terraced, man–land and man–*jhum* land ratio in Nungbi Khullen village. Total land available in the sampled households is 35.92 acres. Of which 19.62 acres are terraced land while 16.30 acres are *jhum* land. With the available 130 persons in

the sampled household, average man–land ratio is 1:0.28. Man–land ratio, however, differs from house to house in the village and it ranges from 1:0.12 to 1:0.57. Man–*jhum* land ratio is smaller and alarming extensively as the average ratio is only 1:0.13. *Jhum* lands per head in many households are as small as 0.03 acre. If it is calculated at the rate of 60 tin of paddy per *Sangam*, then the production from 0.03 acre is only 2.90 tin of paddy which will give 20.32 kgs. of rice after grinding. It is extremely worrisome to think what will happen to the *jhumias* with only 20.32 kgs. of rice in a year from his *jhum* field. It is also observed that more than 45 per cent of the total land available in the sampled households are under *jhum* while about 54 per cent of the total land are under terraced in the sampled households of Nungbi Khullen village.

Table 5.9 is showing the distribution of sampled households practising *jhum*/terraced/both categories in Nungbi Khullen village. Overlapping in the system of practicing agriculture is again observed. Of the total sampled households, 95.24 per cent are practising *jhum* with or without terraced while almost all household are practising terraced cultivation with or without *jhum*. About 5 per cent household are practicing only terraced cultivation. There is no household in the village who practises only *jhum*.

5.3.4: Labour–production ratio

Although main food crop paddy is not cultivated in *jhum* field, the approximate production of other crops from *jhum* field with work

force available in various households are taken to determine the labour-production ratio. Production of terraced cultivation is not under calculation. In *jhum* field, requirement of labour differs from field to field as it has different slope gradient, soil nature, vegetation cover etc. In case of shortage of labour, labour from the village itself or any other labour from outside the village is hired. They are payed no money but the same labour. Thus, any requirement of labour is maintained by the available working force of the individual households.

Table 5.10: Distribution of sampled households according to the labour-production ratio in *jhum* cultivation in Nungbi Khullen village of Ukhrul district (2002)

S No	House No	Total No of Persons	In *Jhum*		Production of rice in *jhum*		Earning from other crops (in Rs.)	Total earning from *jhum* (in Rs.)	Ratio
			Person working	Percentage to the total persons	In Kgs	In Rs			
1	1	9	2	22 22	–	–	6,000	6000	1 3000
2	5	5	2	40 00	–	–	4,000	4000	1 2000
3	7	8	2	25 00	–	–	6,000	6,000	1 3000
4	11	6	2	33 33	–	–	8,000	8,000	1 4000
5	16	6	2	33 33	–	–	4,000	4,000	1 2000
6	35	6	2	33 33	–	–	4,000	4,000	1 2000
7	40	9	3	33 33	–	–	2,000	2,000	1 666
8	52	6	2	33 33	–	–	1,000	1,000	1 5000
9	59	7	3	42 86	–	–	3,000	3,000	1 1000
10	61	5	3	60 00	–	–	4,000	4,000	1 1333
11	62	4	2	50 00	–	–	3,000	3,000	1 1500
12	75	7	3	42 86	–	–	1,500	1,500	1 500
13	81	6	2	33 33	–	–	50,000	50,000	1 2500
14	101	9	2	22 22	–	–	50,000	50,000	1 2500
15	109	5	2	40 00	–	–	5,000	5,000	1 2500
16	121	2	2	100 00	–	–	5,000	5,000	1 1000
17	133	4	3	75 00	–	–	2,000	2,000	1 2666
18	140	9	5	55 56	–	–	8,000	8,000	1 1000
19	151	7	2	28 57	–	–	5,000	5,000	1 7500
20	157	5	2	40 00	–	–	15,000	15,000	1 1750
21	167	5	–	–	–	–	3,500	3,500	–
Total		130	48	39 92	–	–	104,000	104,000	1 2166

Note 1$≃ 49 Indian Rupees, 1£ ≃ 76 Indian Rupees, 1 Euro≃50 Indian Rs
Source Based on field Survey (2002)

A perusal of table 5.10 shows that out of 130 persons in the sampled households, 48 persons are working in the *jhum* field of various households. The sampled households earn about Rs. 104,000 from jhum field in a year. Thus, the average labour-production ratio in the sampled households is 1:2166. The ratio differs from house to house and it ranges between 1:500 to 1:7500.

5.3.5: Resultant Socio–economic condition

Due to dependence on terraced cultivation and adopting horticulture on the hill slopes with financial assistance from outside, slightly better socio–economic conditions in this village was observed during the field survey. This village is now looking forward to gain progressive with economic viability and ecological soundness.

Though a little better condition prevails in the village, the nature of exploiting forest and natural resources injudiciously poses threat on the ecosystem. Aged members of the village have traditional lifestyle and they sticks to traditional working methods which gives low returns. Their inability to leave *jhum* is a barrier to bring this village into progressive model. Intensive labour is always necessary in hill slope fields where only manual labour is applicable. No tractors and other machines are used. So, life of villagers is bound to work throughout the year in the forest or in the *jhum* fields.

Hence, further organizational movement and awareness of the villagers regarding the negative impact of *jhum* and traditional method

of exploiting natural resources in forest is necessary by providing educational facilities etc. to bring sustainable development in this village. Cash crops such as elaichi, tea, coffee etc. are cultivable in *jhum* fields to gain more money.

5.4: Socio-economic conditions of the sampled *jhumias* in Mongkot Chepu village

Mongkot Chepu village is located in the Ukhrul tribal development block of Ukhrul district (fig. 5.1). It is about 35 kms. from Imphal. This village is situated at the hill slope along Imphal-Ukhrul highway near Litan (an important commercial centre of Ukhrul district). Buses and other transport vehicles are available in daily life. Market and medical facilities are also available in Litan (within half km. from Mongkot Chepu).

This village is inhabited by Kuki Simte tribes who have different kind of characteristics of their own. They are very labourious, hard working and sincere. They have innocent looks. Though there is better facility in and around this village, the people are totally bound in their traditional lifestyle. Movement of Youth Organizations plays a key role in any function and ceremony of the village. Kuki Students Organization (KSO) is the most vital organization of this village. Agriculture, mainly *jhum* is the mainstay of the people. Availability of flat lands give a chance to practise terraced cultivation with traditional irrigation.

According to 1991 Census, total population of the village was 689 of which, 364 were males and remaining 325 were females. More than 54 per cent of the total population are literate. This village has 104 households. On an average one household has 6.6 persons in the village. The economic classification of population shows that, of the total population, 47.75 per cent are main workers (170 males and 159 females) while 52.25 per cent of the total population are non-workers. There were no marginal workers. Out of the total main workers, 83.28 per cent are cultivators (116 males and 158 females), 0.91 per cent are engaged in livestock, forestry, fishing, hunting and plantation orchards and allied activities. While 15.81 per cent are engaged in other services.

5.4.1: Land Tenure

In Mongkot Chepu village, the village headman is the sole authority of the land. Field survey revealed that the entire land belonged to the village headman. Whatever changes made in the landuse should be made after his final decision. No individual right exists. There are no such condition that one should practise his *jhum* in the same field where he did before *jhum* cycle. Once *jhum* land is alloted to individual household, he could practise there in the same piece of land for 3 years continuously. After that *jhumias* have to leave the *jhum* site for natural recuperation of soil. Selection of *jhum* site and allotment to individual families are the duties of village headman with the help of other elder and experienced members of the village. Some

special safeguards are provided to those elder *jhumias* who helped and supported the headman in selecting the *jhum* site by observing soil conditions.

Jhumias totally ignored from any kind of soil conservation methods and land development techniques due to land ownership system. They practise *jhum* for their needs. Number of persons and availability of working force in a particular household is considered as a factor for alloting an area of *jhum*.

In case of terraced cultivation, there is no role of village headman. One can do any changes in his field on his own decision. Paddy is the main food-crop every year and in winter *rabi* crops like peas are also grown.

5.4.2: Cropping Period and *Jhum* Cycle

Although there are only one year cropping mainly in Tangkhul Naga villages in Ukhrul district, this Mongkot Chepu village which is inhabited by Kuki Simte tribes, is doing 3 years continuous cropping with crop rotation in years. Field study reveals that in the first year, soyabean is the main crop in the *jhum* fields followed by paddy as the main food crop in second and third year. Mixed cropping is practised with crops like paddy, maize, soyabean, beans pea, chillies, ginger, coriander, mustard leaves, potato, arum, brinjal, banana etc.

Traditional varieties of crops are used in *jhum* with dibbling method. Rain is the only means of water necessary in *jhum* field and in

terraced field, some traditional type of irrigation are adopted through channels and rivers. Modern techniques of high yielding varieties, manures, fertilizers, pesticides and insecticides are not used in the *jhum* fields.

After three years of continuous cropping the *jhumias* leave the *jhum* field and abandoned it for 5-6 years for soil reason. This 1:2 ratio of cropping period and *jhum* cycle is alarming. This figure indicates that the soil loss in one year cropping should have to regenerate again in next 2 years. This is not possible in the present trend.

5.4.3: Man-land ratio

It is not an easy task to know the land owned by *jhumias*. They don't have acre or hectare based land boundaries. So, one has to find out approximate land owned by individual families based on production. Calculation is done based on 50 tin of paddy per *sangam* for *jhum* cultivation while 120 tin of paddy per *sangam* in case of terraced cultivation.

Table 5.11: Distribution of sampled households according to ownership of *jhum*, terraced land, man-land and man-*jhum* land ratio in Mongkot Chepu village of Ukhrul district (2002)

S. No.	House No.	No. of Persons	Terraced land	*Jhum* land	Total land	Percentage of the total land		Man-land ratio	Man-*jhum* land ratio
			(In acres)*			Terraced	*Jhum*		
1.	9	4	--	0.50	0.50	--	100.00	1:0.12	1:0.12
2.	32	7	--	1.49	1.49	--	100.00	1:0.21	1:0.21
3.	67	8	--	0.99	0.99	--	100.00	1:0.21	1:0.21

4.	56	4	--	0.99	0.99	--	100.00	1:0.25	1:0.25
5.	51	6	--	1.05	1.05	--	100.00	1:0.18	1:0.18
6.	42	5	--	0.99	0.99	--	100.00	1:0.20	1:0.20
7.	44	6	--	1.05	1.05	--	100.00	1:0.18	1:0.18
8.	45	6	--	0.99	0.99	--	100.00	1:0.16	1:0.16
9.	75	7	0.88	--	0.88	100.00	--	1:0.13	--
10.	59	9	--	0.99	0.99	--	100.00	1:0.11	1:0.11
11.	27	5	--	0.99	0.99	--	100.00	1:0.20	1:0.20
12.	21	8	--	0.99	0.99	--	100.00	1:0.12	1:0.12
Total		**75**	**0.88**	**11.02**	**11.90**	**7.39**	**92.61**	**1:0.16**	**1:0.16**

Note: * Since the land figures are very small, it has not been converted into hectares.

Source: Based on Field Survey (2002)

Table 5.12: Distribution of sampled households practising *jhum*/terraced/both categories in Mongkot Chepu village of Ukhrul district (2002)

S.No.	Category	No. of Households	Percentage of Sampled Households
1.	No. of households surveyed	12	--
2.	No. of household practising *jhum* (with or without terraced)	--	--
3.	No. of households practising terraced (with or without *jhum*)	--	--
4.	No. of households practising only, *jhum*	11	91.67
5.	No.of households practising only terraced	1	8.33
6.	No.of households practising both categories	--	--

Source: Based on Field Survey (2002).

Out of 104 households in the village, 12 households were sampled based on 10 per cent random sampling. Selection of household was done with a rough idea given by villagers that about 10 per cent

households were practising terraced cultivation while remaining 90 per cent households were dependants on *jhum* cultivation.

Table 5.11 is showing the distribution of sampled households according to ownership of *jhum*, terraced, man-land and man-*jhum* land ratio in Mongkot Chepu village. Total land available in the sampled households are 11.90 acres (11.02 acres *jhum* land and 0.88 acre terraced land). Average man-land ratio in the sampled households is 1:0.16. It shows that the land available per head in the sampled households is 0.16 acre. The production in this 0.16 acre is only 13 tins of paddy at the rate of 50 tin per *Sangam*. One *jhum*ia could get only 91 kgs of rice (13 tin of paddy = 13x7 kg of rice = 91 kgs of rice) in a year. This is not enough amount of food crop for one's survival a year. In some households, the land holding per head is even less than the average village figure. Man-*jhum* land ratio is also about same in the village.

Table 5.12 is showing the distribution of sampled households practising *jhum*/terraced/ both categories. It is observed that of the 12 sampled households, 91.67 per cent households are practising only *jhum* while 8.33 per cent households are practising only terraced cultivation.

Availability of land per head especially in *jhum* is very low and ultimately very low production. Poor soil of 5-6 years *jhum* cycle with 3 years continuous *jhum* again augmented the negative impact on production. Though official Census report does not mention any more

activities rather than cultivation in the village, the villagers are bound to do other extra earning activities like selling food to the bus passengers at Litan. Trade and commerce is also done at Litan. Villagers are in touch with state capital Imphal in daily life and they are looking forward to supplement their subsistence farming by other activities. Litan, an important commercial centre on the Imphal-Ukhrul highway is a boon to the life of tribals in and around. Mongkot Chepu is just near this commercial centre and villagers earned atleast some amount of money from various commercial activities.

5.4.4: Labour-Production ratio

Work force (person working in *jhum*) in respective household and total earning from *jhum* were taken into consideration for calculating labour-production ratio. Manual labour, using some small tools and implements is the main input in *jhum*. To know the annual earning of individual family, the production of paddy from *jhum* field is converted in kgs. of rice and then multiplied by the cost of rice i.e., Rs. 12 per kg. Earnings from other crops in *jhum* field is upto Rs. 1,000 in each *jhum* practising family. Thus, production is known by adding this entire amount. Any production from terraced cultivation is not taken in calculating labour-production ratio.

A perusal of table 5.13 shows that in the sampled households of Mongkot Chepu village, 53.33 per cent of the total population are working in *jhum* fields. The total production of rice is 6,160 kgs and the total earning from *jhum* field is Rs. 82,060 in the sampled

households. Thus, average labour-production ratio in these households is 1:2,051. It means one labour used to earn Rs. 2,051 in a year from *jhum* field.

Table 5.13: Distribution of sampled households according to the labour-production ratio in *jhum* cultivation in Mongkot Chepu village of Ukhrul district (2002)

S. No.	House No.	Total No. of Persons	In *Jhum*		Production of rice in *jhum*		Earning from other crops (in Rs.)	Total earning from *jhum* (in Rs.)	Ratio
			Persons working	Per centage to the total persons	In Kgs	In Rs.			
1.	9	4	2	50.00	280	3,360	640	4,000	1:2000
2.	32	7	5	71.43	840	10,080	420	10,500	1:2100
3.	67	8	3	37.50	560	6,720	780	7,500	1:2500
4.	56	4	4	100.00	560	6,720	800	7,520	1:1880
5.	51	6	4	66.67	595	7,140	900	8,040	1:2010
6.	42	5	3	60.00	560	6,720	780	7,500	1:2500
7.	44	6	3	50.00	595	7,140	860	8,000	1:2666
8.	45	6	4	66.67	560	6,720	780	7,500	1:1875
9.	75	7	--	--	--	--	--	--	--
10.	59	9	4	44.44	490	5,880	620	6500	1:1625
11.	27	5	2	40.00	560	6,720	780	7,500	1:3750
12.	21	8	6	75.00	560	6,720	780	7,500	1:1250
Total		**75**	**40**	**53.33**	**6,160**	**73,920**	**8,140**	**82,060**	**1:2051**

Note: 1. The production of rice has been converted into money value on the basis of current price of rice. 1kg of rice costs Rs. 12 (2002). The money value of other crops as reported has also been added.

2. 1$≃ 49 Indian Rupees, 1£ ≃ 76 Indian Rupees, 1 Euro≃50 Indian Rs.

Source: Based on Field Survey (2002)

Hiring of labour system is adopted in case of inadequacy of labour force in *jhuming* in this village. No money is paid for hiring labour but the same labour should be repaid in the fields of hired labour. Sometimes food-grains are also given to needy persons.

5.4.5: Resultant socio-economic condition

Though there are availability of transport and communication, marketing and other facilities near and around the Mongkot Chepu village, the village is still in traditional life either due to their boundness in traditional *jhum* cultivation or tribalism in nature of life. People are in a mood to change their lifestyles by adopting better occupations, but the possibility so far seems to be nil.

Land belongs to the village chief. The agrarian system prevailing in the economy is somewhat akin to semi-feudal type. Village chief has overriding power over the utilization of the village land. Land are, however, distributed and each villager is allowed to cultivate a plot of land for three years continuously. A villager or an outsider who has become the subject of the village chief with the formal permission of the latter is entitled to a plot of land for cultivation. Generally, cultivation of a plot of land is an entitlement for a bonafide villager but such entitlement does not in any case, constitute permanent individual ownership of land. Only the chief enjoys rights over the land. The *jhumias* or the tenants-at-will, as a rule, pay grain rent to the village chief. This is a kind of tax imposed for cultivating the chief's land by individuals family.

This ownership of land doesn't support any kind of soil conservation and development of land. Three years continuous cultivation without any soil conserving and enriching method in *jhum* leads maximum loss of soil fertility and ultimately very low production. Short *jhum* cycle i.e., 5 to 6 years could not recuperate the soil loss and situation is grim as far as soil nature is concerned.

Land holding, man-land ratio, man-*jhum* land ratio and labour-production ratio in this village is extremely in an alarming situation. Very low production in *jhum* in comparison with other surveyed Tangkhul Naga villages of the same district indicates the negative impact of chieftain economy.

5.5: Socio-economic conditions of the sampled *jhumias* in Maku Kuki Village

Maku Kuki village is located in Kamjong–Chassad tribal development block of Ukhrul district (fig. 5.1). It is about 100 km far from Imphal. This village is situated at the eastern most hill range of Manipur extending from north to south. Transport and communication facilities are not available except a *kuccha* road which is bifurcated from Ukhrul-Kamjong highway. To avail any facility like market, medical or transports, the villagers have to go walking for atleast 5 to 10 kms.

This village is inhabited by Kuki tribes who are labourious and hard working. Except for few commercial activities, the life of this village totally depends upon *jhum* cultivation.

According to 1991 Census, total population of the village is only 39 of which, 24 were males and remaining 15 females. There are only 6 households in this village. On an average one household has 6.5 persons in the village. About 21 per cent of the total population are literate. The economic classification of the population shows that of the total population, about 46.15 per cent are main workers (11 males and 7 females) while 53.85 per cent of the total population are non–workers. Out of the total main workers, 77.78 per cent are cultivators (7 males and 7 females) while 22.2 per cent are engaged in other services. There are no marginal workers in this village.

5.5.1: Land Tenure

Field survey revealed that in this village, land totally belongs to the village headman. Headman is the sole authority of land. There is no individual right regarding utilization of land. For *jhuming* purpose, a piece of land, which is according to the need and availability of man–power, is given to each household for a particular year. This act of allotment of land is the work of village headman under his own decision. After three years of continuous cropping in the same *jhum* field, *jhumias* leave the land for natural regeneration of vegetation.

5.5.2: Cropping period and *jhum* cycle

Field study reveals that traditional varieties of crops are grown with dibbling method continuously for three years in this village. Crop rotation is also practised in certain years. Mixed cropping is practised

with crops like rice, maize, soybean, beans, pea, chillies, ginger, coriander, mustard leaves, potato, arum, brinjal etc. *Jhumias* never care about the land and they do not take up any measure to conserve soil in the field perhaps due to the prevailing land ownership system.

Rain is the only source of water in *jhum* fields. There is no man–made irrigation facilities in the *jhum* field. Moreover, modern technique of higher production by using high yielding varieties, manures, fertilizers, pesticides, insecticides and any kind of machines are not used by *jhumias*.

Field observation shows that after three years cropping, the area of *jhum* is left fallow for 6–7 years. After a period of 6–7 years, *jhumias* come back again at the same *jhum* site for cultivation. This period of fallowing field is called *jhum* cycle. The ratio between cropping period and fallowing period clearly indicates the alarming situation in soil conditions in the village.

5.5.3: Man-Land ratio

The economy of this village is agrarian in nature and *jhum* cultivation is the only method practised in this village. To find out the *jhum* land owned by individual families, 55 tins of paddy per *sangam* is taken as unit.

Table 5.14 is showing the distribution of sampled households according to the ownership of *jhum*, terraced, man–land, man–*jhum* land ratio in Maku Kuki village. There is no terraced land in the

village. About 9.58 acres of *jhum* land is available in the current year. With a total population of 39, the average man–land ratio in this village is 1:0.24.

Table 5.14: Distribution of sampled households according to ownership of *jhum*, terraced, man–land and man–*jhum* land ratio in Maku Kuki village of Ukhrul district (2002)

House No.	No. of Persons	Terraced land	*Jhum* land	Total land	Percentage to the total land		Man–land ratio	Man *jhum* land ratio
		(in acres*)			Terraced	*Jhum*		
1	8	–	2.25	2.25	–	100.00	1:0.28	1:0.28
2	6	–	1.69	1.69	–	100.00	1:0.28	1:0.28
3	9	–	2.25	2.25	–	100.00	1:0.25	1:0.25
4	5	–	1.13	1.13	–	100.00	1:0.23	1:0.23
5	7	–	1.13	1.13	–	100.00	1:0.16	1:0.16
6	4	–	1.13	1.13	–	100.00	1:0.28	1:0.28
Total	39	–	9.58	9.58	–	100.00	1:0.24	1:0.24

Note:* Since the land figures are very small, it has not been converted into hectares.

Source: Based on Field Survey (2002)

Table 5.15: Distribution of sampled households practising *jhum*/ terraced/both categories in Maku Kuki village of Ukhrul district (2002)

S. No.	Category	No. of households	Percentage of sampled households
1.	No. of household Surveyed	6	100.00
2	No. of household practising *jhum* (with or without terraced)	–	–
3	No. of household practising terraced (with or without *jhum*)	–	–
4	No. of household practising only *jhum*.	–	–
5	No. of household practising only terraced.	6	100.00
6	No. of household practising both category.	–	–

Source: Based on Field Survey (2002)

Table 5.15 is showing the distribution of sampled households practicing *jhum*/terraced/both categories. There is no overlapping in the categories. Almost all households in the village are practising only *jhum*.

5.5.4: Labour–Production Ratio

Total approximate earning from *jhum* field in a year and available working force are taken into consideration to know the labour–production ratio in this village. Calculation is done mainly on the production of rice. Production differs from crop to crop. Rice being a dominant food crop of the village, study is mainly emphasized on the production of rice. To know the production in terms of rupees, amount of rice in kgs. is multiplied by Rs. 12 (average cost of rice per kg. in the region). Other crops which are mixed with rice also gives atleast some money in each family. So, around Rs. 1,000/– is added in each family's income from rice in a year.

A perusal of table 5.16 shows that about 35.90 per cent of the total population are working in the *jhum* field in Maku Kuki village. Total production of rice is 5,950 kgs. in the current year. Total earning from *jhum* (including rice and other crops) is Rs. 75,800. Thus, the labour–production ratio in the village is 1:5,414 in the current year.

Table 5.16: Distribution of sampled households according to the labour-production ratio in *jhum* cultivation in Maku Kuki village of Ukhrul district (2002)

S. No.	House No.	Total No. of Persons	In *Jhum*		Production of rice in *jhum*		Earning from other crops (in Rs.)	Total earning from *jhum* (in Rs.)	Ratio
			Person working	Percentage to the total persons	In Kgs	In Rs.			
1	1	8	3	37 50	1,400	16,800	700	17,500	1 5833
2	2	6	2	33 33	1,050	12,600	900	13,500	1 6750
3	3	9	3	33 33	1,400	16,800	700	17,500	1 5833
4	4	5	2	40 00	700	8,400	600	9,000	1 4500
5	5	7	2	28 57	700	8,400	800	9,200	1 4600
6	6	4	2	50 00	700	8,400	700	9,100	1 4550
Total		39	14	35 90	5,950	71,400	4,400	75,800	1 5414

Note: 1. The production of rice has been converted into money value on the basis of current price of rice. 1kg of rice costs Rs. 12 (2002). The money value of other crops as reported has also been added.

2. 1$≃ 49 Indian Rupees, 1£ ≃ 76 Indian Rupees, 1 Euro≃50 Indian Rs.

Source: Based on Field Survey (2002).

5.5.5: Resultant Socio-economic condition

The overall condition of the village is still traditional either due to the traditional *jhum* or remoteness of the village. Moreover, system of land ownership has a negative impact on the socio-economic conditions of the village. Village chief has overriding power over the utilization of land. Land is alloted to individual families and families are allowed to cultivate a plot of land for three years without break. These villagers who got land to cultivate have to pay grain rent to the village chief as a rule. This is a kind of tax imposed by village headman for cultivating his land by individual families. Not only this, the system of land ownership does not support any kind of soil conservation and development of land.

Looking after the condition of land holding, man–land ratio and labour production ratio, this village which is inhabited by Kuki tribes is more seriously alarming than other Naga tribes inhabited villages. Production of rice and other crops are very low. This very low production in the *jhum* indicates the negative impact of chieftain economy and short *jhum* cycle.

Though the *jhumias* are aware about the ill-impact of this land ownership system and traditional *jhum* cultivation, they presently, are not in a position to leave these systems. They need outside support especially government aid to get an alternative to *jhum*.

PART – III

IMPACT ON THE ECOSYSTEM

CHAPTER – VI

IMPACT OF *JHUM* CULTIVATION ON THE ECOSYSTEM OF UKHRUL DISTRICT

In the previous chapters we have seen that *jhuming* is a widely practised food production system in Manipur. Steep slopes are selected, forest vegetation is cut and burnt, and large number of crops are grown in mixture. This system in present context has become not only unproductive but also hazardous to the environment. Exposure of rocks due to soil erosion, heavy silt load in stream and drying of perennial water sources, loss of plant nutrients loss of forestry resources, loss of flora of human and animal importance are some of the major hazardous effects of *jhuming*.

Jhuming has been critisized on ecological and socio-economic grounds. Large scale burning of forests, destruction of natural habitats and the consequent reduction of species of fauna and flora are some of the conspicuous results observed in Ukhrul district. According to ecologist and environmentalists, *jhuming* is economically unviable and ecologically unsustainable. Field surveys have shown that its continuation damages the ecosystem converting the lush green forests into ecologically slums. Despite its adverse ecological and environmental consequences, *jhuming* is not easy to be stopped in Ukhrul district. In fact, it is a way of life evolved as a reflex to the physiographical character of land under unique geo-climatic conditions.

There are convincing reasons behind the practise of *jhuming* as it is the genera de vie of the tribal societies. The climate, the terrain, the food habits of the people, their socio-economic and cultural needs,

their self-reliance and their desire to be close to nature all have a say in *jhuming*. In other words, their way of life, training, social organizations, economic institutions, political systems, ceremonies, feasts, festivals and the entire gamut of life are the products of *jhuming* system.

In the days when this system of food production emerged, it worked well and there was a balance between population and soil fertility as a result of large *jhum* cycle of 20 to 30 years. Field surveys showed that the cycle in the present time has reduced to 5 to 15 years and also even less than 5 years in some cases. Now, *jhuming* is considered to be absolutely wasteful and has become hazardous to the ecosystem of the area.

In this chapter an attempt has been made to examine the direct and indirect impacts of *jhum* cultivation on the ecosystem. This chapter is based on both secondary sources of data collected from various government offices and primary sources of data collected from survey of five sampled villages, one each from every tribal development block of Ukhrul district where *jhum* is practised. About 10 per cent of the households practising *jhum* were sampled from every village to obtain indepth information.

Indiscriminate cutting and destruction of forest trees and vegetation for the *jhuming* purpose cause denudation of forest. Burning down of dried vegetation also affects the soil properties. Not only that, in treeless hill slopes which had been cleared by slash-and-

burn method, occurred soil erosion, rill wash, gully wash etc. due to certain exogenetic agents like wind and rain. Thus, forest degradation, soil erosion, changes in soil fertility, loss of valuable flora and fauna are considered as direct impacts of *jhum*. Indirect impacts of *jhum* on ecosystem are global in nature and much more odd and serious. *Jhuming* is integrally associated with cutting and burning down of forests and trees. Deforestation is again associated with many extreme hazardous problems in the ecosystem. Trees and forests in the hills provide a store room of water and conserve it to feed the rivers throughout the year. If the trees are not there on the hill slopes, rain water flows down without any barrier, causes flood in the plains and also dryness of rivers to cause drought with no water in the hills. It becomes hazardous. The ecological balance favouring hydrological cycle is disturbed. The disturbance of a particular habitat through long misuse is probably expressed most remarkably in the degrees of collapse of the hydrological cycle(Ingty,1981). *Jhuming* has the capacity as a factor for such a change. Thus, these problems such as changes in hydrological cycle, flood, drought and also greenhouse effects and global warming are considered as indirect impacts.

Field surveys have shown that *jhuming* is adversely affecting the ecology and environment. Effects of *jhuming* on the following factors have been examined:

1. Loss of Forest
2. Soil Erosion
3. Loss of soil fertility

4. Loss of Flora

5. Loss of Wild Life

6. Changes in hydrological processes

6.1: Loss of Forest

The process involved in *jhuming* is slash and burn of vegetation followed by the cultivation crops. First a plot of land is selected. Then, it is cleared off by felling trees and undergrowth. Indiscriminate cutting and destruction of trees and vegetation for the purpose of *jhum* causes loss of forest cover. *Jhuming* has been considered destructive to the ecology. With an increase in population the pressure on these ecologically fragile areas worsens. Increase of population leads to deforestation and *jhuming*. Bulging population and deforestation are definitely associated with each other. Loss of forest cover due to *jhuming* in Manipur in estimated to be 60.3 thousand hectares(1995-96)(Ranjan, R. and Upadhyay,V.P.,1999).

Thus, large quantity of forest vegetation is burnt in the process of *jhum* in Ukhrul district. Though the exact information on this aspect is lacking in this region, yet people are aware of the degradation of forest. If no steps are taken to curtail this process, there is a probability that in due course of time the forest may disappear. An attempt has been made to assess by field survey the cutting down of forest for the purpose of *jhum* in the sampled villages of Lungphu, Yeasom, Nungbi Khullen, Mongkot Chepu and Maku Kuki of Ukhrul district.

6.1.1: Loss of forest in Lungphu village

In Lungphu village, lying in Phungyar-Phaisat tribal development block of Ukhrul district, there are 73 households. Out of these, only 67 households are practising *jhum*. A 10 per cent stratified random sampling of the households practising *jhum* was conducted. About 7 households which are practising *jhum* were sampled for indepth study.

Table 6.1 is showing the deforestation by the sampled households practising *jhum* in Lungphu village (2002). In the 7 sampled households, a total of 14.86 acres of forest have been degraded by *jhuming*. On an average, one household has degraded 2.12 acres of forest. If we calculate it for the whole village where 67 households are practising *jhum*, then it works out to be 142.04 acres. Thus, about 142 acres of forest has been degraded in the Lungphu village for *jhum* purpose.

Table 6.1: Area of forest lost by sampled households practising *jhum* in Lungphu village of Ukhrul district(2002)

Sl.No.	House No.	Total No. of household	Total No. of household practising *jhum*	Area of forest lost(in acres)	Reason for deforestation
1.	37	1	1	3.72	*Jhum*
2.	46	1	1	0.62	"
3.	48	1	1	0.62	"
4.	49	1	1	3.70	"
5.	56	1	1	1.24	"
6.	55	1	1	2.48	"
7.	53	1	1	2.48	"
Total		**7 households**	**7 households**	**14.86**	***Jhum***

Source: Based on Field Survey (2002)

6.1.2: Loss of forest in Yeasom village

In Yeasom village, which is lying in Kasom-Khullen tribal development block of Ukhrul district, there are 46 households. Of these, only 40 households are practising *jhum*. About 10 per cent stratified random sampling of the housheols practising *jhum* was conducted to assess the loss of forest. Thus, 7 households which are practising *jhum* were sampled for indepth study.

Table 6.2: Area of forest lost by sampled households practising *jhum* in Yeasom village of Ukhrul district(2002)

Sl.No.	House No.	Total No. of household	Total No. of household practising *jhum*	Area of forest lost(in acres)	Reason for deforestation
1.	23	1	1	2.22	*Jhum*
2.	2	1	1	2.66	"
3.	10	1	1	1.06	"
4.	8	1	1	0.62	"
5.	6	1	1	1.24	"
6.	15	1	1	1.33	"
7.	14	1	1	1.68	"
Total		**7 households**	**7 households**	**10.81**	***Jhum***

Source: Based on Field Survey (2002)

Table 6.2 is showing the deforestation by the sampled households practising *jhum* in Yeasom village (2002). In the 7 sampled households, a total of about 10.81 acres of forest have been cut for *jhum* practise. So, on an average, one household has cut 1.54 acres of forest. If calculation is done for the whole village where 40 households are practising *jhum*, then it works out to be 61.60

acres. Thus, about 62 acres of forest has been degraded in the Yeasom village for *jhum* purpose.

6.1.3: Loss of forest in Nungbi Khullen village

Nungbi Khullen village, which is located in Chingai tribal development block, has 186 households, of which only 176 households are practising *jhum* with or without terraced cultivation. A stratified random sampling of the households practising *jhum* was conducted. About 11 per cent sampling was done to assess the loss of forest. Thus, 20 households which are practising *jhum* were sampled for indepth study.

Table 6.3: Area of forest lost by sampled households practising *jhum* in Nungbi Khullen village of Ukhrul district(2002)

Sl.No.	House No.	Total No. of household	Total No. of household practising *jhum*	Area of forest lost(in acres)	Reason for deforestation
1.	1	1	1	1.00	*Jhum*
2.	5	1	1	0.62	"
3.	7	1	1	1.00	"
4.	11	1	1	1.24	"
5.	16	1	1	0.62	"
6.	35	1	1	0.62	"
7.	40	1	1	0.31	"
8.	52	1	1	1.55	"
9.	59	1	1	0.46	"
10.	61	1	1	0.62	"
11.	62	1	1	0.46	"
12.	75	1	1	0.23	"

13.	81	1	1	0.77	"
14.	101	1	1	0.77	"
15.	109	1	1	0.77	"
16.	121	1	1	0.31	"
17.	133	1	1	1.24	"
18.	140	1	1	0.77	"
19.	151	1	1	2.32	"
20.	157	1	1	0.62	"
Total		**20 households**	**20 households**	**16.30**	***Jhum***

Source: Based on Field Survey (2002)

Table 6.3 is showing the deforestation by the sampled households practising *jhum* in Nungbi Khullen village. In the 20 sampled households, about 16.30 acres of forest have been degraded for *jhuming*. So, one household has cut about 0.82 acres of forest for *jhum* purpose. In the whole village where 176 households are practising *jhum*, a total area of about 144.32 acres of forest has been cut down.

6.1.4: Loss of forest in Mongkot Chepu village

Mongkot Chepu village lies in Ukhrul tribal development block. It is a Kuki tribe inhabited village where the whole land belongs to the village headman who has the exclusive right to allot a piece of land to individual family for *jhum* for three years. Field survey reveals that though there are 104 households in the village, only 95 households are practising *jhum* with or without terraced cultivation and remaining are

practising only terraced cultivation. A stratified random sampling of about 11 per cent households which practise *jhum* was conducted to assess the loss of forest.

Table 6.4: Area of forest lost by sampled households practising *jhum* in Mongkot Chepu village of Ukhrul district(2002)

Sl.No.	House No.	Total No. of household	Total No. of household practising *jhum*	Area of forest lost(in acres)	Reason for deforestation
1.	9	1	1	0.50	*Jhum*
2.	32	1	1	1.49	"
3.	67	1	1	0.99	"
4.	56	1	1	0.99	"
5.	51	1	1	1.05	"
6.	42	1	1	0.99	"
7.	44	1	1	1.05	"
8.	45	1	1	0.99	"
9.	59	1	1	0.99	"
10.	27	1	1	0.99	"
11.	21	1	1	0.99	"
Total		**11 households**	**11 households**	**11.02**	***Jhum***

Source: Based on Field Survey (2002)

Table 6.4 is showing the deforestation by the sampled households practising *jhum* in Mongkot Chepu village (2002). In the 11 sampled households, about 11.02 acres of forest have been cut down for *jhuming*. So, on an average, one household has degraded 1.00 acre of forest. If it is calculated for the whole village where 95 households are practising *jhum*, then it works out to be 95 acres. Thus, in Mongkot Chepu village, a total of about 95 acres of forest has been degraded for *jhum* purpose.

6.1.5: Loss of Forest in Maku Kuki village

Maku Kuki village is located in Kamjong-Chassad tribal development block of Ukhrul district. Only 6 households live in this village, Every household practices *jhum*. So, all the 6 households were surveyed to assess the loss of forest.

Table 6.5: Area of forest lost by the sampled households practising *jhum* in Maku Kuki village of Ukhrul district (2002)

Sl.No.	House No.	Total No. of household	Total No. of household practising *jhum*	Area of forest lost(in acres)	Reason for deforestation
1.	1	1	1	2.25	*Jhum*
2.	2	1	1	1.69	"
3.	3	1	1	2.25	"
4.	4	1	1	1.13	"
5.	5	1	1	1.13	"
6.	6	1	1	1.13	"
Total		**6 households**	**6 households**	**9.58**	***Jhum***

Source: Based on Field Survey (2002)

Table 6.5 is showing the deforestation done by the 6 sampled households practising *jhum* in Maku Kuki village(2002). A total area of about 9.58 acres of forest has been degraded in the current year for *jhum* purpose.

Table 6.6: Total area of Forest lost for practising *jhum* in the 5 sampled villages in Ukhrul district (2002)

Sl. No.	Name of the sampled village	Total No. of households	Total No. of households practising *jhum*	Average area of forest lost per household for *jhum*(in acres)	Total area of forest lost for *jhum* (in acres)
1.	Lungphu	73	67	2.12	142.04
2.	Yeasom	46	40	1.54	61.60
3.	Nungbi Khullen	186	176	0.82	144.32
4.	Mongkot Chepu	104	95	1.00	95.00
5.	Maku Kuki	6	6	1.60	9.60
Total	**5 villages**	**415 households**	**384 households**	**1.18**	**452.56**

Source: Based on Field Survey (2002)

Table 6.6 shows that in the five sampled villages of Ukhrul district 384 households are practising *jhum* and the *jhumias* have cut down about 452.56 acres of forest for *jhuming*. Hence, average area of forest lost in these five villges is 90.51 acres. If we calculate the total area of forest lost in Ukhrul district where 222 villages are practising *jhum*, then it works out to be about 20,093 acres or 8,135 hectares of forest are being cut down per year for the purpose of *jhum*.

This assessment of forest lost in Ukhrul district is more or less accurate if we compare it with the figures given by Manipur Remote Sensing Application Centre, Imphal based on satellite imagery. In 1986-87, an area of 14,231 hectares were under current *jhum* while in 1993-94, the area under current *jhum* decreased to only 8,460 hectares

due to certain reasons like Government participation to bring any alternative to *jhum*, works of NGO's like IFAD (International Fund for Agricultural Development, Rome), awareness among the people and disturbance in human environment in the recent past. The figure of 2002 assessment based on field survey was 8,135 hectares under current *jhum*. It shows a decrease in area under current *jhum* from the previous years.

6.2: Soil Erosion

Jhuming involves cutting of forest, burning of cut stocks and cultivation of variety of crops on hill slopes. Absence of soil conservation measures augmented with high rainfall results in increased runoff, erosion of top soil, decline of soil fertility and low crop yields.

The process of soil erosion begins when farmers enter into the plots (hill slopes under forest) either for selection of site or for cutting the forest vegetation. Their movement on slopes causes loose soil aggregates, forest litter and earthworm casting to slide down the hill. *Jungle*-cutting, burning, clearing and dibbling of seeds account for a considerable amount of loose soil material, ashes, earthworm casting and detached soil clods/stones to roll down the foot hills. Through this process 3.7 tonnes of soil materials per hectare was reported to slide down the foot hills (Singh,1978).

With the onset of monsoon, soil erosion by water begins. Studies on this aspect under various stages of shifting cultivation have indicated that soil erosion problem in shifting cultivation is mainly of splash and wash(Singh and Singh,1978). Soil erosion from hill slopes (60-70%) under first year, second year, abandoned *jhum*(first year fallow) and bamboo forest was estimated to be 146.6, 170.2, 30.2 and 8.2 tonnes per hectare per year respectively(Singh and Singh,1978). These observations clearly indicate that the second year of *jhum* cultivation is comparatively more hazardous than the first year. However, wide range of variation in soil erosion due to slope, crop canopy and agricultural operations had been recorded. Runoff and losses of organic carbon increased with increase in slope upto 21 per cent, but it decreased linearly with further increase in slope. Soil losses, however increased with the increase in slope upto 60 per cent, but it decreased with further increase in slope. Losses of available phosphorus and potassium were negligible (Rai,1978).

It is obviously true that high rainfall and steep hill topography is always associated with problem of severe soil erosion, particularly when the landuse system has biotic interference. Studies conducted by various workers in the north-eastern region of India have revealed quantitative facts on soil erosion hazards associated with various systems practised on hill slopes.

Table 6.7: Soil erosion hazards associated with landuse practices in north-eastern region of India

Sl.No.	Landuse system/practices	Experimental plot size	Soil loss(ton/ ha./year)	Average annual rainfall (in mm.)	References
1.	Shifting Cultivation	Small	30.2-170.2	1600	Singh et al. (1980)
2.	Pineapple cultivation along the slope (1st 2 years)	Small	24.0-62.5	1600	Gosh (1976)
3.	Mixed crop of maize and rice	Small	19.7-21.0	1600	Rai,(1981)
4.	Rice crop on slope	Small	32.9-45.0	1600	Awasthi (1984)
5.	Bare fallow	Small	83.8	1600	Awasthi (1984)
6.	Tuber Crops on raised bed (Bun)	Medium	40.0-50.0	1800	Singh et al. (1981)
7.	Cropping system	Medium	51.0-83.8	1600	Awasthi (1984)
8.	Grass cover (planted)	Medium	10.83	1600	Awasthi (1984)
9.	Natural bamboo forest	Field	0.04-0.52	1600	Singh,1978
10.	Shifting Cultivation	Field	5.1-83.3	1600	Singh (1976 &1982)

Note: Area of small, medium and field size plots were in range of 2-5, 16-40 and 69,000m^2 respectively.

Source: Prasad, R.N. et al.(1990)

Table 6.7 is showing that in all the landuse system on the hill slope where rainfall is around 1,500-2,000 mm per year, there is proof of soil erosion. Even in natural bamboo forest area, there is loss of soil through erosion in little amount. In the field where shifting cultivation is practised, soil erosion ranges from 5.1 to 170.2 tonnes per hectare per year.

Thus, the loss of soil through erosion is widely known in the fields of sampled villages in Ukhrul district where survey was conducted. But the amount of soil lost in particular year is not known due to no availability of measuring facilities for soil erosion. Decreasing production of crops from first year to succeeding years shows the deterioration of the quality of soil through erosion. Moreover, high production rate of crops like paddy in one year cropping *jhum* fields mainly in Tangkhul Naga inhabited villages and low rate of production of paddy in 3 years continuous cropping fields in Kuki tribes inhabited villages shows maximum lost of soil in the fields where intensive cropping is done.

6.3 Loss of Soil fertility:

The practise of *jhuming* affects the soil properties. Burning causes changes in the soil properties. Burning chemically alters a portion of the plant nutrients supply from an organic form to a mineral form in ash which is often readily soluble (Debyle and Packer, 1974). When water runs over or passes through this ash, the soluble components are flushed out and lost from the site in the run off.

An attempt has been made to assess the soil fertility in the five sampled villages namely Lungphu, Yeasom, Nungbi Khullen, Mongkot Chepu and Maku Kuki of Ukhrul district. Soil samples were collected from each of the villages and were tested to assess the fertility status.

Methods of collecting soils comprise observing the colour, texture and nature of soil with naked eyes in a particular field by

dividing it into four roughly equal parts. If the general nature of soil are same in all the four parts of the field, then a little amount of soils are collected from four divided places and also from centre by digging the earth upto a depth of 15-20 cm. in V-shape. All the soils of a particular field are mixed together. Then the soil is tested. Same process is repeated once before and after burning operation.

More or less same results were observed in all the soil samples which were tested from different *jhum* sites. pH values of soil increased slightly in all the sampled soils after burning. Percentage of organic carbon in the soils decreased after burning. The quantity of potassium (K_2O) increased substantially after burning. While the amount of phosphorus in kg. per hectare is more or less same before and after burning.

6.3.1 : Loss of soil fertility in Lungphu Village

Table 6.8 is showing the changes in soil properties before and after burning in the *jhum* fields in Lungphu village in Ukhrul district.

Table 6.8: Changes in soil properties before and after burning in Lungphu Village (2002).

Soil Properties	Before Burning	After Burning	Changes
pH	4.20	4.60	+0.40
Organic Carbon (%)	1.30	1.00	-0.30
Available P_2O_5(Kg/ha)	4.20	4.25	+0.05
Available K_2O(Kg/ha)	250	550	+300

Source: Based on Field Survey (2002)

Table 6.8 shows that in the *jhum* fields of Lungphu Village, pH value of soil which was 4.20 before increased to 4.60 after burning. Percentage of organic carbon in the soil decreased from 1.30 to 1.00 only after burning down the dried vegetation in the *jhum* fields. Available potassium (K_2O) at the rate of kg. per hectare substantially increased from 250 to 550 after burning while phosphorus (P_2O_5) content also increased slightly from 4.20 to 4.25 kg per hectare.

6.3.2: Loss of soil fertility in Yeasom village

Table 6.9 is showing the changes in soil properties before and after burning in Yeasom village of Ukhrul district.

Table 6.9: Changes in soil properties before and after burning in Yeasom Village (2002).

Soil Properties	Before Burning	After Burning	Changes
pH	4.00	4.40	+0.40
Organic Carbon (%)	1.15	1.00	-0.15
Available P_2O_5(Kg/ha)	3.30	3.32	+0.02
Available K_2O(Kg/ha)	270	600	+330

Source: Based on Field Survey (2002)

Table 6.9 shows that in the *jhum* field of Yeasom village, properties of soil changed after burning. The pH value of the soil increased from 4.00 to 4.40. Organic carbon content was 1.15 per

cent before burning and after burning it was 1.00 per cent. Potassium increased from 270 kg. per hectare to 600 kg per hectare after burning. Phosphorus content in the soil before and after burning is roughly same with 3.30 kg per hectare and 3.32 kg. per hectare respectively.

6.3.3: Loss of soil fertility in Nungbi Khullen village

Table 6.10 is showing the changes in soil properties before and after burning in Nungbi Khullen village of Ukhrul district. It shows that in the *jhum* fields of Nungbi Khullen village, pH value of soil increased after burning. It was 4.10 before burning and increased to 4.40 after burning. Contents of organic carbon after burning is little less than before. Phosphorus is not much affected with burning while the amount of potash increased from 285 kg per hectare before burning to 570 kg per hectare after burning.

Table 6.10: Changes in soil properties before and after burning in Nungbi Khullen Village (2002).

Soil Properties	Before Burning	After Burning	Changes
pH	4.10	4.40	+0.30
Organic Carbon (%)	1.00	0.90	-0.10
Available P_2O_5(Kg/ha)	3.70	3.71	+0.01
Available K_2O(Kg/ha)	285	570	+285

Source: Based on Field Survey (2002)

6.3.4: Loss of soil fertility in Mongkot Chepu village

Table 6.11 is showing the changes in soil properties before and after burning in the *jhum* fields of Mongkot Chepu village in Ukhrul district. It shows that the pH value which was 4.50 before increased to 4.80 after burning in Mongkot Chepu village. Percentage of organic carbon was 0.94 before burning but it changed to 0.85 after burning. Available phosphorus is more or less same before and after burning with 4.00 kg per hectare and 4.01 kg per hectare respectively. While the contents of potash is extremely higher after than before with 300 kg per hectare before burning and 600 kg per hectare after burning.

Table 6.11: Changes in soil properties before and after burning in Monkot Chepu Village (2002).

Soil Properties	Before Burning	After Burning	Changes
pH	4.50	4.80	+0.30
Organic Carbon (%)	0.94	0.85	-0.09
Available P_2O_5(Kg/ha)	4.00	4.01	+0.01
Available K_2O(Kg/ha)	300	600	+300

Source: Based on Field Survey (2002)

6.3.5: Loss of soil fertility in Maku Kuki village

Table 6.12 is showing the changes in soil properties before and after burning in Maku Kuki village of Ukhrul district.

Table 6.12: Changes in soil properties before and after burning in Maku Kuki Village (2002).

Soil Properties	Before Burning	After Burning	Changes
pH	5.00	5.50	+0.50
Organic Carbon (%)	0.95	0.82	-0.13
Available P_2O_5(Kg/ha)	4.96	7.97	+0.01
Available K_2O(Kg/ha)	300	650	+350

Source: Based on Field Survey (2002)

Table 6.12 shows that in the *jhum* fields of Maku Kuki village, pH value of soil is 5.00 before burning and it increased to 5.50 after burning. Organic carbon decreased from 0.95 per cent to 0.82 per cent after burning. Amount of available phosphorus is not affected by burning but the amount of potash increased from 300 to 650 kg. per hectare after burning.

Hence, it is observed from the above findings that in all the villages where survey was conducted and soils were tested before and after burning, the soils are found to be acidic. Results of the pH value of soil both before and after burning ranges between 4 to 6. It shows that the soils are weak acidic. It is also known that if the pH value of soil is higher, the percentage of organic carbon is lower. Increase in pH is related to increase in the content of available potash. Generally, these hill soils are rich in potash while inadequate in phosphorus content.

6.4: Loss of Flora

The flora and fauna of an area depends on the total environmental conditions of that area. It is common knowledge that disturbance of any one factor has its influence on the other like affect on flora and ultimately affect the fauna. The vegetation of a region is the overall composition of dominant species and an account of the general physiognomy of the plant growth; the flora is an enumeration of all plants occurring in an area, usually without a commentary on dominance of individual species. *Jhuming* influence both the vegetation and the flora.

At all the stages of *jhuming* (like selection of the spot for cutting trees and shrubs, process of cutting trees and shrubs in the spot, burning of plant material, cultivation on this spot for varying number of years depending on the fertility of soil and finally abandonment of this spot for a fresh spot) have direct or indirect influence on evolution of flora of the region. The soil of an area sustains plant growth and hence, changes in soil in turn affects the flora. As we have already observed in sections 6.2 and 6.3 that *jhuming* effects the soil mainly (a) due to the removal of the tree canopy, there is no obstruction to mechanical force, rain and the falling water dislocates soil, (b) rainfall causes increase in leaching and acidity of soil and (c) increased acidity renders soil unsuitable for

plant growth and makes it further unsuitable and vulnerable to washing away. The humus which would have been created by falling leaves and other vegetable material is not available any more, further adding to acidity of the soils. Such disturbances affect the micro-flora and micro-fauna of the soil which in turn affects the flora.

The researcher has made some observations in changes in the flora of the *jhum* lands in Ukhrul district. This district is gifted with rich flora and there are hundreds of varieties of trees, barderian flowering plants, orchids of enumerable hues and kinds, epiphetic ferns, varied species of plants and shrubs. Some of the known species of plants and trees are Alnus (Alnus Nepalensis), Prunus auriculifornis, Parkia Javanica, Paraserrianthes falcotaria, Michelia oblanga, Omilina arborea, Pinus kerya, Robinea psedudoacacia, besides various iris species, wild rose, red and white rhododendrons etc. (http://ukhrul.nic.in/uflfauna.htm).

The moist deciduous forests in the Indo-Myanmar border areas also sustains rare flora. It has been reported that in one year six species of plants new to India and two species new to science were discovered from these forests and there are still many more plants yet to be identified and named. (Forest Deptt., Govt. of Manipur, 1997).

Table 6.13 : Types of trees under attack in Ukhrul District

Name of the trees available	Main trees under attack
Alder (Alnus Nepalensis), Prunus, Cirosirdes, Symingtonia, Acacia auriculifornis, Parkia Javanica, Paraserrianthes falcolaria, Michelia oblanga, Omilina arborea, Pinus Kerya, Robinea psedudoacacia etc.	Phoebe hainesiana, Alder, Pinus Kerya, Parkia Javanica and orchids of enumerable hues and kinds, epiphetic ferns and various species of plants and shrubs.

Source: 1.http://ukhrul.nic.in
2.Based on field survey (2002)

The following changes in flora of the study area attributable primarily to *jhuming* have been reported.

a. In some spots certain trees and shrubs are scarce and may become further rear or even eliminated from the flora of the region e.g. Phoebe hainesiana, Alder, Pinus Kerya, and Parkia Javanica etc. are becoming scarce in most of the areas of Ukhrul district where *jhuming* is practised.

b. In the process of cutting trees and burning the site, many parasites and epiphytes get depleted or eliminated from the flora e.g., unique species of orchids, epiphetic ferns and variants species of shrubs were collected from Ukhrul district but in subsequent visits it could not be located from the same area, as the area had been under *jhuming*.

c. After the tree cover is removed many components of the ground find the habitat no more suitable for their survival or reproduction but perished.

The flora of this area is one of the richest in India. But at present excepting some groves, the vegetation is disturbed in most of the areas where *jhum* is practised. It is a common sight to observe treeless grass covered hills.

6.5: Loss of Fauna

Wildlife in the natural situation constitutes the most important component of the ecosystem, which participate effectively in the energy flow and biogeochemical cycling. Animal - plant and animal – animal can only participate in this unique process when its habitat and niche are preserved. *Jhuming* has led to habitat destruction and thus has threatened the very fabric of the survival of the wildlife. It destroys the habitat continuity, micro-habitats etc. The lost habitat is not possible to reclaim even after many years of abandoning the site.

The problems which crop up for the wildlife due to *jhuming* can be divided into two categories – direct and indirect. The direct problems which is associated with *jhuming* in relation to wildlife may be (Bhattacharjee, P.C. 1990):

a. Loss of habitat continuity affects the wild animals mainly

elephants, tigers, leopards and other smaller mammals.

b. Loss of top canopy occurs due to *jhuming* and this affects the behaviour of the langurs and gibbons. It also reduces the territorial area of species. Food exploration areas are reduced.

c. In an exposed land due to *jhuming* the predator has more chance of being exposed against the pray. The result is loss of energy.

d. The tigers and leopards capture pray from a hideout with a distinct posture which are likely to be affected by *jhuming*.

e. The small mammals like porcupines, manis, hedger hog etc. are affected because *jhuming* exposes them to unknown situation.

f. The *jhum* site cannot be reclaimed and restored to in relation to wild life, when the *jhumias* stop *jhuming* at that particular site. In fact restoration requires many more years. New forest areas with natural habitats are being destroyed. Thus, accumulating the harmful affects of *jhum* destroys wild animals.

g. *Jhum*, a hundred yeas ago and a *jhum* at present, so far the total affect on wildlife is concerned, is multiplied many times because it is now associated with the similar irreversible destructive patterns.

Indirectly *jhum* affects much more seriously than the direct methods.

a. *Jhuming* upsets the ecological balance which brings on imbalance in the hydrological cycle. It further disturbs habitat. This ultimately affects the survival of the wildlife.

b. Soil erosion reduces the soil fertility which further reduces the total energy production of the forest resulting in the shrinkage and loss of wild animals.

c. Silting of the river causes floods and it leads to loss of wildlife in the plain areas.

The age old practise of *jhuming* at present has become very harmful due to shorten *jhum* cycles, shrinkage of forest areas etc. This has resulted in destruction of habitat and the survival of wild life. The tropical forest of Ukhrul district is also the habitat of many valued species of birds and animals. Many threatened species like Trogopan blythii, Pangolin (ant eater), Salamander, Tiger, Porcubine, Hooting Monkey, Leopard, big, small and medium size black bears, Elephant, wild buffalo, wild boars, Deers and Stags, Wild goats and many unidentified species are found in this region. Birds of various colours and sizes are also found here including some migratory birds (http://ukhrul.nic.in/ uflfauna.htm).

The respondents from the five sample villages namely Lungphu, Yeasom, Nungbi Khullen, Mongkot Chepu and Maku Kuki, reported of disappearing wild life from their area. They reported that a large number of birds and animals have become extinct from their villages and neighbouring areas. The Javan Rhinoceros which was seen roaming along the Khuga river valley in Churachandpur district as late as the beginning of 20th century, but now it is extinct from Manipur and hence from India. The wild ox of Myanmar known as

'Santhou' in Manipuri was last seen thirty years ago (Forest Deptt., Govt. of Manipur, 1997). In all probability, these animals have vanished from Manipur forever. The Hoolock gibbon, Stump Tailed Macaque, Slow Loris, Clouded Leopard, Golden Cat, Marbled cat, Binturong, Spotted Linsang, Malayan Sun Bear, Smoth Indian Otter, Hog Badger, Malayan Giant Squirrel, Serow (Sabeng) and most of other denizens of forest are making a precarious existence in the forest of Manipur and all of them are on the verge of extinction.

Table 6.14: Animals and Birds which are under threat in Ukhrul district.

Name of the available animals & birds	Threatened Species
Hoolock Gibbon, Stump Tailed Macaque, Slow Loris, Clouded Leopard, Golden Cat, Marbled Cat, Binturong, Spotted Linsang, Tragopan blythii, Pangolin, Salamander, Tiger, Porcubine, Hooting Monkey, Leopard, Black Bears, Elephant, Wild Buffalo, Wild Boars, Deers and Stags, Wild Goats, Wild Ox etc.	Tragopan blythii, Pangolin, Salamander, Tiger, Pangolin, Hooting Monkey, Leopard, big, small and medium size black bears, Elephant, Wild Buffalo, Wild Boars, Deers and Stags, Wild Goats, Wild Ox etc. Hoolock Gibbon, Clouded Leopard, Golden cat etc, are perhaps extinct.
Among the birds, white wood Duck, Pink Headed Duck, Grey Leg Goose, Mallard, Brahmini Duck, Clucking-teal, Plover, Hoover Crame, Brown Headed gull, Avocate white ibis etc.	Among the birds, white wood Duck, Pink Headed Duck, Mallard, Clucking-teal, Avocate white ibis etc.

Source: 1.http://ukhrul.nic.in
2.Based on field survey (2002)

Among the birds, the White wood Duck, Pink Headed Duck, Grey Leg Goose, Mallard, Brahmini Duck, Clucking teal, Plover, Hoover Crame, Brown Headed gull, Avocate white ibis, Glossy Ibis,

Indian shag, open Bill stork, Black Necked stork and a host of other have become extremely rare, and many of them are probably extinct from the state.

The reasons for the dwindling wildlife are not far to seek. An explosion of human population with diverse and intense human activities have had far reaching effects on wildlife. Rapid deforestation resulting in habitat destruction coupled with indiscriminate hunting of birds and animals have threatened many species with extinction. In the hills, where people pride themselves as traditional hunters, it would be a pity soon enough if they are left with no animals to hunt at all. The messages of conservation is yet to reach the interior hills of Manipur, and so, only the economic development of the people would enable them to overcome the compulsions of over exploiting the living natural resources of the state.

6.6: Changes in hydrological processes

Jhum cultivation is a major cause of forest loss in the hilly areas where it is practised. This leads to the reversal in the pattern of precipitation. Floods and droughts are the outcome of the loss of forest. In a forested area where no *jhum* or any other economic activity is done, falling raindrops are intercepted by the forest canopy and major portion of the rainfall reaches the ground surface. Thus, forests with the help of their roots, stores the available water from rain and feeds many big rivers throughout the year. It gives a balance

between biotic and abiotic components of the ecosystem. On the contrary, deforested lands mainly for *jhum* receives the rain directly on the earth's surface with high energy and thus the ground surface is loosened and is eroded by falling rain drops which results in the compaction of loose materials and thus surface run off increased but infiltration is markedly reduced. This process leads to increase in channel flow causing floods on one hand while reduced infiltration results in poor recharge which reduces the replenishment of groundwater storage on the other hand. Moreover, these processes also intensify the magnitude and dimension of floods.

Drought is more deadly. The increased dryness for prolonged period causes draught condition. This related to the amount of rainfall received, its departure from normal average annual value and local demand of water for various purposes. It is not the amount of total annual rainfall which matters for drought or wet conditions rather it is the regularity and irregularity of rainfall which matters more.

Thus, due to changes in landuse, deforestation associated with *jhum* cultivation etc., the regularity and magnitude of rainfall in local and regional level has caused changes in the hydrological processes in the study area. Due to the decline in the forest area especially in the hilly regions with intensive *jhum* cultivation, frequent floods occur in the Imphal valley comprising of all the four districts of Manipur. Magnitudes of floods have also increased. Flood which occurred in 2001 in Manipur was one of the most hazardous one.

Another flood which occurred last year (Aug, 2002) was also one of the biggest one. This affected almost all the valley districts of Manipur. Though, drought, on the other hand, had never been a frequent phenomenon in Manipur, but severely drought was experienced in 1999 with no water even in many rivers such as Thoubal, Iril and Imphal etc. The Thoubal and Iril rivers are fed by the hills (covered by forests) of Ukhrul district and the dryness of these rivers is directly the outcome of human activities like deforestation mainly for *jhum* cultivation, for fuel and timber purposes in Ukhrul district. Thus *jhum* cultivation directly or indirectly cause adverse affects on the ecosystem and the effects on ecosystem are related to each other in one way or other.

CONCLUSION

The main conclusion which arise from the forgoing analysis is that:

- The physico-socio-cultural environment of Ukhrul district has compelled the local people to adopt *jhuming.*
- The mountainous topography, undulating slopes and wet weather conditions almost all the year round provides ideal condition for people to practise *jhuming.*
- *Jhuming* is a way of life for the tribals. Their needs, food habits, folklores, festivals and the overall cultural ethos has a say in *jhum.*
- The life of the *jhumias* is that of a desperate struggle for survival in such harsh conditions.
- With the increase of population the *jhum* cycle has decreased and this has resulted in the degradation of the ecosystem.

In the hill tracts of Manipur inhabited by the tribals, *jhum* cultivation has been and is even today traditionally practised. A hill slope is cleared of its natural vegetation by cutting and burning, seeds are broadcast and the crop is harvested on maturity. The slope is then left fallow for the rest of the *jhum* cycle. The *jhumias* move to another slope. This has been the principal mode of livelihood in this remote district of Manipur.

The adverse physical and environmental consequences of *jhum* cultivation have been well accepted. It destroys the ecological balance, results in substantial soil erosion which subsequently leads to flooding of rivers, dries up hill springs and destroys valuable forests. As population increases, a vicious

circle starts. The *jhum* cycle becomes shortened and soil fertility is not fully restored, yields decline and further areas are brought under *jhum*, so that the *jhum* cycle is further shortened. It was reported that in some parts of Manipur, *jhum* cycle have been reduced to 2 to 4 years.

Opinion is divided on the economic and social desirability of *jhuming*. One section of respondents thought that in a situation of inadequacy of other resources for earning livelihood, *jhuming* represents the only source of income generation in the hilly regions. It has now been deeply embedded in the social and cultural patterns of those dependant on it so that the control of *jhuming* becomes a socio-cultural traumatic experience. The other section of respondents are given the idea of the damaging consequences for the natural resources. It is a matter of time before *jhuming* can totally damage the social and economic fabric of life.

Manipur is an isolated hill grit state in the North-Eastern corner of India. This state is subdivided into nine districts namely, Imphal East, Imphal West, Bishnupur, Thoubal which lies in the central valley and Senapati, Ukhrul, Chandel, Churachandpur and Tamenglong districts which lies in the hill areas. Ukhrul district was chosen as the study area because:

- of its location in the hill areas, its mountainous topography, undulating slopes and wet weather conditions which provides suitable conditions for *jhuming*.

- More than 93 percent of the populations of Ukhrul district are tribals mainly Nagas and Kukis who are the main *jhum* cultivators in Manipur.

These tribes have been practising *jhum* for centuries. It is a way of life for them.

- Earlier work on various aspects of *jhuming* has been conducted in different areas of North-East India and a little attention has been paid of Ukhrul district, where nearly 40 per cent of the total area is under *jhum*.

The author has made extensive use of primary data which was drawn from a comprehensive survey of 5 villages with the help of a questionnaire (Appendix 1). The sampled village were located in different tribal development blocks (Ukhrul district is divided into 5 tribal development block) and were a good representation of *jhumias* belonging to different tribes. The two predominant tribes living in Ukhrul district are the Tangkhul Naga and Kukis. Of the 5 sampled villages Lungphu, Yeasom, and the Nungbi Khullen are dominated by Tangkhul Naga tribes while Mongkot Chepu and Maku Kuki villages are dominated by Kuki tribes. About 55 households (13.25%) were sampled from these 5 villages. From the village Lungphu situated in Phungyar - Phaisat Tribal development block, 8 *jhumia* households were sampled. From the village Yeasom situated in Kasom Khullen tribal development block, 8 *jhumia* households were sampled. From the village Nungbi Khullen situated in Chingai tribal development block, 21 *jhumia* households were sampled. From the village Mongkot Chepu situated in Ukhrul tribal development block, 12 *jhumia* households were sampled and from the village Maku Kuki situated in Kamjong-Chassad tribal development block, 6 *jhumia* households were sampled.

In the foregoing chapters we have tried to analyze our data to test the hypothesis that we had set before us while undertaking this work. The following general conclusion may be drawn from the study:

1. Due to hilly nature of the terrain, undulating slopes and wet weather conditions, people practise *jhum*. Ukhrul district lies in the hilly area of Manipur. It is located at an elevation ranging between 388 and 2,834 meters above mean sea level. The district is divided into three hilly regions. The northern hilly region spreads over the north western parts and covers more than half of central subdivision. It has three hill ranges with a maximum height of 2,568 m. and minimum height of 1,155 m. above mean sea level. The eastern hilly region spreads over the eastern part. It has one hill range with a maximum height of 2,834 m. and minimum height of 453 m. above mean sea level. The southern hilly region extends over the south western part and occupies more than half of the Ukhrul district. The region has five hill ranges. The district has monsoon type of climate and it receives heavy rainfall for atleast seven months (April to October). Thus the whole of Ukhrul district is mountainous with undulating slopes and wet weather conditions. In such physical conditions people are compelled to practise *jhum*.

2. Ukhrul district is a land of beautiful mountains interspersed by numerous tribal habitats. Of the total population of this district, nearly 94 percent comprises of tribal population. The most predominant tribal community living here on the basis of population is the Tangkhul Naga followed by the *Thadou* and the *Vaiphei*. The *Thadous* and the *Vaiphei* are the major

sub-clans of Kuki tribes. The tribals are traditionally bound and they practise primitive agriculture. *Jhum* is a way of life for them. It has deeply embedded in their lifestyle. They practised it for their livelihood. Thus, their needs, food habits, self reliance, folklores, festivals and overall cultural ethos have a say in *jhum*.

3. The tribals have to face difficulties of mountainous terrain, steep slopes (98% of the total area), poor soils, heavy rains, less invigorating climate, mosquito infestations, poor means of transport and communication and a life of isolation. Under such an adverse physico- socio-cultural environment his life is that of a desperate struggle for survival. As a result he is compelled to adopt a primitive mode of cultivation that is *jhuming*.

4. Recent figures for area under *jhum* is not available. So the figures which are available have been considered. In 1986-87, 99,162 hectares and in 1993-94, 162,547 hectares were under *jhum* (Manipur Remote Sensing Application Centre, Imphal, 1995). This shows that Ukhrul district has recorded an increase of 13.95 per cent area under *jhum* during the last eight years (till 1993-94). The area under secondary forest has decreased by 13.94 percent. This shows that the amount of increase in area under *jhum* is the amount of decrease in area under forests. Thus, *jhuming* is still a way of life for the tribals of Ukhrul district.

5. Increasing or decreasing of area under current *jhum*, abandoned *jhum* and forest differs from watershed to watershed in Ukhrul district. These changes were monitored with the help of satellite imagery based data and

maps of 1986-87 and 1993-94 (Manipur Remote Sensing Application Centre, Imphal, 1995).

In Thoubal river watershed, 24 per cent of total area was covered by *jhum* with 1.55 per cent under current *jhum*, while 67.87 per cent was covered by mixed forest in 1986-87. The area under mixed forest has decreased by 44.37 per cent of the total area in 1994 and so the percentage of *jhum* increased by 47.51. Interestingly, the percentage of area under current *jhum* decreased from 1.55 to 0.83 in 1994.

Iril river watershed had only 26.89 per cent area under *jhum* with 1.72 per cent area under current *jhum* in 1994. It had 54.63 percent area under forest, 37.66 percent area under *jhum* and 4.35 percent area under current *jhum* in 1987. It recorded a decrease of 27.74 percent area under forest while an increase of 27.73 percent area under *jhum*. But the area under current *jhum* decreased from 4.34 percent in 1987 to 1.72 percent in 1994.

In Chingai river watershed, 72.34 percent area was under forests while 21.73 percent area was under *jhum* and 1.85 per cent area under current *jhum* in 1986-87. Forest area decreased to 48.84 percent in 1994 while the area under *jhum* increased to 45.26 percent. Current *jhum* area had decreased from 1.85 percent to 1.09 percent.

In Chamu river watershed 65.16 percent area was covered by forest while 32.06 percent area was under *jhum* in 1986-87. The forest area had decreased to 34.15 percent while area under *jhum* increased to 63.07 percent. Area under current *jhum* increased from 2.29 percent in 1986-87 to 3.28 percent in 1993-94.

In other four watersheds i.e., Taret river watershed, Tuyungbi-Maklang river watershed, Maklang Nagayal river watershed and Khunukhong Sanalok river watershed, 78.73 percent, 75.79 percent, 83.81 percent and 91.86 percent of the total area of the watersheds were under forest cover in 1987 whereas, in 1994 the area under forest had changed to 83.17 percent, 74.00 percent, 87.23 percent and 85.98 percent respectively. This shows that where the percentage of forest area increased, the percentage of *jhum* area decreased and vice-versa.

Thus, in Ukhrul district, 75.00 percent of the total area was under forest while 21.82 percent area was under *jhum* with only 3.13 percent area under current *jhum* in 1986-87. But in 1993-94, the area under mixed forest and *jhum* were 61.06 percent and 35.77 percent respectively with 1.86 percent area under current *jhum*. Though the area under total *jhum* category has increased from 21.82 percent in 1986-87 to 35.77 percent in 1993-94, the area under current *jhum* decreased from 3.13 percent in 1986-87 to 1.86 percent in 1993-94.

6. Results of slope analysis of the different micro-watersheds showed that 81.58 percent of the area falls in the very steep slope category, 16.28 percent falls in the moderately steep to steep slope category and 1.43 percent lies in the strongly sloping slope category. Human activities are affected by slope aspects. The slope of any area determines the type and possibility of cultivation. In spite of this fact that Ukhrul district is characterized by hilly terrain and very steep slopes where soil erosion intensity is very high, *jhuming* is still practised and it is a way of life for the tribals.

7. The results of comprehensive survey of the 5 villages namely, Lungphu, Yeasom, Nungbi Khullen, Mongkot Chepu and Maku Kuki situated in the

five tribal development blocks of Ukhrul district and inhabited by Tangkbul Naga and Kuki tribes throws light on the following facts:

(a) Land Tenure:

Field surveys have shown that both the village community and individual *jhumias* have separate rights on the *jhum* fields. In the sampled Tangkhul Naga inhabited villages namely, Lungphu, Yeasom and Nungbi Khullen, *jhum* land were owned by individual *jhumias* and they could make any changes in their fields. But the *jhumias* are bound to move together at one site for *jhum*. The selection of *jhum* site is done by the whole community under the leadership of village headman. In every selected *jhum* site, individual households have their own *jhum* fields. Whereas in the sampled Kuki inhabited villages namely, Mongkot Chepu and Maku Kuki, all land belongs to the village headman. He is the sole authority and can utilize any land. Individual households have no right to use any piece of land without prior permission of the village headman. Headman, with the help of aged experienced *jhumias*, selects a *jhum* site and allots the land to the individual *jhumias* for three years. In return, the *jhumias* have to pay foodgrains to the headman for utilizing his land. Thus, the land tenurial system differs from the Tangkhul Naga inhabited villages to the Kuki inhabited villages. In the Tangkhul Naga inhabited villages the individual *jhumias* have partially their own rights while in Kuki inhabited villages the headman has a say in all the matters.

(b) Cropping period and *jhum* cycle:

Cropping period and *jhum* cycle differs from village to village. Field survey have shown that in the 5 sampled villages, cropping period is of one year

in the Tangkhul Naga inhabited villages and 3 years in Kuki inhabited villages. Long *jhum* cycle i.e. of 15 years is prevailing in Lungphu village. In Yeasom village, *jhum* cycle is of 9 to 10 years. While in Nungbi Khullen village, *jhum* cycle ranges between 5 to 10 years. All these three villages are inhabited by Tangkhul Nagas. Whereas, in Kuki inhabited villages, the *jhum* cycle is of 7 years in Maku kuki village and 5 years in Mongkot chepu village. This clearly shows that Tangkhul Naga inhabited villages have short cropping period but long *jhum* cycle while kuki inhabited villages have long cropping period but short *jhum* cycle.

(c) Man-land ratio:

Man-land ratio is one important indicator of development. Results obtained from the survey of the five sampled villages shows that the man – land ratio in Tangkhul Naga inhabited villages are 1:0.32 in Yeasom village, 1:0.28 in Lungphu village and 1:0.28 in Nungbi khullen village. Whereas, in Kuki inhabited villages it is 1:0.24 in Maku Kuki village and 1:0.16 in Mongkot Chepu village. Again, man – *jhum* land ratio are 1:0.26 in Lungphu, 1:0.25 in Yeasom, and 1:0.13 in Nungbi Khullen village. Whereas, in Maku Kuki and Mongkot Chepu, it is 1:0.24 and 1:0.16 respectively.

(d) Labour-Production Ratio

Results of field survey showed that in the Tangkhul Naga villages the labour-production ratio was 1:6,000 in Yeasom, 1:4,514 in Lungphu and 1:2,166 in Nungbi Khullen village while in Kuki inhabited villages it was 1:5,414 in Maku Kuki and 1:2,051 in Mongkot Chepu village. Thus, average labour-production

ratio in the Tangkhul Naga inhabited villages is about 1:4,227 whereas, in the kuki inhabited villages it is about 1:3733.

8. Indiscriminate cutting and destruction of trees and vegetation for the purpose of *jhum* has caused loss of forest cover. *Jhuming* has been considered destructive to the ecology. With an increase in population the pressure on these ecologically fragile areas have worsened. Field surveys revealed that in the 7 sampled households of Lungphu village, a total of 14.86 acres of forest have been degraded for *jhuming*. On an average one household has degraded 2.12 acres of forest. Thus the 67 households which are practising *jhum* in this village have degraded about 142 acres of forest. In Yeasom village, 40 households are practising *jhum*, a total of about 62 acres of forest area has been degraded for *jhum* purpose. In Nungbi Khullen village, 176 households are practising *jhum*, about 144 acres of forest has been cut down. In Mongkot Chepu village, a total of about 95 acres of forest has been degraded for *jhum* purpose by 95 *jhum* practising households. In Maku Kuki village, about 9.58 acres of forest has been degraded in the current year for *jhum* purpose by 6 households.

Thus, in the five sampled villages of Ukhrul district, a total of about 452.51 acres of forest has been lost. Average area of forest lost in these five villages is 90.51 acres. In the whole Ukhrul district where 222 villages are practising *jhum*, a total of about 20,093 acres or 8,135 hectares of forest is being cut down per year for the purpose of *jhum*.

9. It is obviously true that high rainfall and steep slopes is associated with problems of severe soil erosion, particularly when the landuse system have biotic interference. *Jungle* cutting, burning, clearing and dibbling of

seeds in *jhum* accounts for a considerable amount of loose soil material, ashes, earthworm casting and detached soil clods/stones to roll down the foothills. Through this process 3.7 tonnes of soil materials per hectare was reported to slide down the foot hills. It was also reported that soil erosion from hill slopes (60-70%) under first year, second year, abandoned *jhum* (first year fallow) and bamboo forest were estimated to be 146.6, 170.2, 30.2 and 8.2 tonnes per hectare per year respectively. Moreover, high production rate of crops like paddy in one year cropping *jhum* fields mainly in Tangkhul Naga inhabited villages and low rate of production of paddy in 3 years continuous cropping fields in Kuki inhabited villages shows maximum loss of soil in the fields where intensive cropping is done.

10. The practise of *jhuming* affects the soil properties. Burning causes changes in the soil properties. Burning chemically alters a portion of the plant nutrients supply from an organic form to a mineral form in ash which is often readily soluble. When water runs over or passes through this ash, the soluble components are flushed out and lost from the site in the run off.

Soil samples were collected from each of the five sampled villages before and after burning and tested to assess the fertility status. More or less same results were observed in all the soil samples which were tested from different *jhum* sites. pH value of the soil increased slightly in all the sampled soils after burning. Percentage of organic carbon in the soils decreased after burning. The quantity of potassim (K_2O) increased substantially after burning.

While the amount of phosphorus in Kg. per hectare is more or less same before and after burning.

11. Field surveys have shown the following changes in flora of the study area which is attributable primarily to *jhuming*.

    a. In some spots certain trees and shrubs are scarce and may become further rare or even eliminated from the flora of the region, e.g. Phoebe hainesiana, Alder, Pinus Kerya and Parkia Javanica etc. are becoming scarce in most of the areas of Ukhrul district where *jhum* is practised.

    b. In the process of cutting trees and burning the site, many parasites and epiphytes gets depleted or eliminated from the flora e.g., unique species of orchids, epiphetic ferns and various species of shrubs were collected from Ukhrul district but in subsequent visits it could not be located from the same area, as the area had been under *jhum*.

    c. After the tree cover is removed many components of the ground find the habitats no more suitable for their survival or reproduction.

12. The age old practise of *jhuming* at present has become very harmful due to shorter *jhum* cycles, shrinkage of forest area etc. This has resulted in destruction of habitat and the survival of wild life. The tropical forest of Ukhrul district is the habitat of many valued species of birds and animals. Respondents from the five sampled villages reported of disappearance of many wild life from their area and neighbouring areas. The Javan Rhinoceros and Wild Ox of Myanmar known as '*Santhou*' in Manipuri have vanished from Manipur forever. The Hoolock Gibbon, Stump Tailed Macaque, Slow Loris, Clouded Leopard, Golden Cat, Marbled Cat,

Binturong, Spotted Linsang, Malayan Sun Bear, Smoth Indian Otter, Hog Badger, Malayan Giant squirrel, Serow (Sabeng) etc. are making precarious existence and all of them are on the verge of extinction. Similar is the case of birds. A number of birds also have become rare and many are probably extinct.

13. *Jhum* cultivation is a major cause of forest loss in the hill areas where it is practised. This leads to the reversal in the pattern of precipitation. Regularity of rainfall has been adversely affected. As a result, floods and droughts are becoming a regular phenomena. Magnitude of these phenomena is also increasing. Floods which occurred in 2001 and 2002 were among the most hazardous one which affected almost the whole valley districts of the state. Drought, on the other hand, had never been a frequent phenomena, but severe drought was experienced in 1999 resulting in scarcity of water and drying up of many rivers like Thoubal, Iril and Imphal. Moreover, soil erosion and landslides on the deforested hill slopes leads to siltation and sedimentation on the river beds causing shallowness in river depth. Sediments brought down by rivers has led to the sedimentation of the floor of rivers and Loktak Lake. Due to decrease in the depth of Loktak Lake the life style of the people living in and around the Lake has been changing. If steps are not taken to save the Loktak Lake by stopping degradation of forests on the hill slopes, a very severe predictable condition will prevail with the drying up of Loktak Lake (which is also a source of hydro-electric power in North East India).

Much has been written, much has been told and much hue and cry has been made over the degradation of the ecosystem due to *jhuming*. Yet, *jhuming*

continues because of the mountainous topography, undulating slopes, wet weather conditions and the tribal population for whom *jhuming* is a way of life.

The government, environmentalists and agricultural scientists have made several attempts to convince the *jhumias* about the serious impacts of *jhum* not only on the ecosystem but also on their socio-economic conditions. The scientists suggested many alternate measures for *jhuming* but their pleas have failed perhaps due to adverse physico-socio-cultural environment in which the tribals are compelled to practise *jhuming*. In coming years, with higher growth of population the demand of food crops will increase. This will intensify *jhuming* if no alternate measures are undertaken.

To minimize the existing problems in connection with *jhum*, the author has suggested the following measures:

- In depth field studies in *jhum* areas is the need of the hour. The problems should be thoroughly investigated and tackled at the grassroot level.
- To control soil erosion, traditional soil erosion control measures should be adopted like construction of mechanical barriers using logs and poles, bamboos and trash, earthen bunds, vegetative barriers etc. The tribals are well acquainted with these measures and they could use them easily.
- Cash crop cultivation, irrigated rice cultivation and livestock production should be intensified.
- Land ownership system particularly in Kuki tribal villages should be changed or improved because the existing system has adverse effect on production as well as on the soil conditions. There should be a fully implementable law so that the lands are directly under *jhumias* and not

under the headman. If *jhumias* are the owners of their land they will look after their land more properly.

- Marketing facilities, transport and communication facilities should be improved.
- Agro-based and forest based industries, bee-keeping, piggery, pisciculture, sericulture, horticulture, forestry and cottage industry are already proved approachable alternatives to *jhum*. This should be implemented gradually.
- Modifications are more applicable than alternatives. Emphasis should be given to modifications of *jhum* like Alder-based *jhum*. Alder-based *jhum* is found to be most suitable modified *jhum*. Alder tree has root nodules which improve soil fertility by fixing atmospheric nitrogen into the soil. It has the capacity to store, conserve and enrich the soil properties. It also enhances crop yields and reduces soil erosion. This tree is widely available in Ukhrul district.

This sustainable productive system has the potential to be adopted on a wider scale. Villages which are having very limited land areas, alder-based *jhum* is found to be suitable to increase food production and to maintain the ecological balance. In addition, it also provides good qualities of timber and firewood from which money can be earned easily.

Thus, any transformation in *jhum* area should be socially acceptable, economically profitable and ecologically sustainable. Any delay in implementation of better techniques will lead to converting the whole area under *jhum* into an ecologically slum.

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APPENDIX -- I

IMPACT OF *JHUM* CULTIVATION ON THE ECO-SYSTEM OF MANIPUR: A CASE STUDY OF UKHRUL DISTRICT.

QUESTIONNAIRE

A. Village Schedule:

1. Name of the village : ----------
2. Tehsil : ----------
3. T.D. Block : ----------
4. District : ----------
5. Accessibility : Yes ..... No.....

   If Yes

   (a) Metalled Road (b) Unmetalled Road (c) Footpath
6. Location of the Village:

   (a) Hill Slope (b) Valley (c) Peak
7. Population (1991)

   Total ..... Male ..... Female .....
8. Religion: (a) Christian .....

   (i) Naga (Specify cast) .....

   (ii) Kuki (Specify cast) .....

   (b) Hindu .....

   (c) Muslim .....

B. Household Schedule:

1. Household No. ----------
2. Name of the Householder ----------
3. Age ----------
4. Sex (a) Male ..... (b) Female .....

5. Size of Family :

Male :..... Female : ..... Total:.....

6. Education and No. of Persons:

Male	Education	Female	Education

7. Land Owned by the Household:

(i) Sedentary..... (ii) *Jhum* .....

8. Work Force in the Household : .....

9. Occupational Structure:

(a) Primary
- Sedentary Agriculture
- Shifting Agriculture
- Forestry
- Mining
- Hunting
- Gathering
- Fisheries

(b) Secondary

(c) Tertiary

10. Type of Agriculture :
(a) Permanent Cultivation
(b) Terrace Cultivation
(c) *Jhum* Cultivation

11. Variety of Seeds :
(a) High Yielding Variety
(b) Improved Variety
(c) Traditional Variety

12. Type of Sawing :
(a) Broadcasting
(b) Transplanting
(c) Drilling/Dibbling
(d) Others.

13 Cropping Patterns

(a) Single

(b) Double

(c) Triple

14 Area under *jhuming* (Appx)

15 Area under *jhuming* (Appx) at one point time

16 *Jhum* area available per head

17 Major crops grown

(a)	Cereals	(b)	Oil Seeds
	Paddy		Groundnut
	Maize		Sesamums
	Wheat		Rape and Mustard
	Other Cereal (Specify)	Other Oilseeds (Specify)	
(c)	Species	(d)	Pulses and Beans
	Chillies		Bengal Gram (Chana)
	Ginger		Arhar
	Turmaric		Pea
	Garlic		Bean
	Coriander		Soyabean
	Other Species (Specify)	Others	
(e)	Vegetables	(f)	Fruits
	Mustard leaves		Pineapple
	Potato		Orange
	Arum		Lemon
	Cabbage		Apple
	Cauliflower		Jackfruit
	Onion		Papaya
	Brinjal		Other (Specify)

	Radish	(g)	Other
	Carrot		Betel Leave
	Lady Finger		Betel Nut
	Other (Specify)		Other (Specify)

18 Area under different crops

Crops	Area
Rice	_____
Maize	_____
Millets	_____
Potatoes	_____
Oilseeds	_____
Sweet Potatoes	_____
Other	_____

19 Average yield per acre

Crops	Area
Rice	_____
Maize	_____
Millets	_____
Potatoes	_____
Oilseeds	_____
Sweet Potatoes	_____
Other	_____

20 *Jhum* Cycle (in years)

21 Land Tenancy
(a) Individual
(b) Community
(Living in a village)

22 Crop Rotation
Yes
No

23. Irrigation : Yes

No

If Yes : Source : (a) Canal

(b) Tank

(c) River

(d) Others

24. Manures : Yes

No

25. Fertilizers : Yes

No

26. Pesticides : Yes

No

27. Tools and implements used in *jhuming*:.....

.....

28. No. of Labour: .....

29. Other inputs in *jhum*: .....

.....

30. Total production in *jhum* field (Appx. in Rs.).....

.....

31. Disposal of production:.....

.....

32. Decision making process:.....

.....

33. Financial aid /support, if any:.....

.....

34. Loans obtained from: (a) Government Agencies

(b) Money Lenders

(c) Other Cultivators

35. Quality soil in certain *jhum* years: (a) 1st Year
(b) 2nd Year
(c) 3rd Year

36. Main problems to carry on *jhuming*:.....

.....

.....

37. Attitude of life: (a) Traditional
(b) Progressive

38. Willing to adopt new technology : .....

.....

39. Source of information about new methods of agriculture:

.....

40. Barriers in the adoption of new technology and innovations:

(a) Terrain (b) Climate
(c) Social (d) Financial

41. Result of *jhum* on nature: .....

.....

42. Specified problems of the village:.....

.....

43. Consequent of *jhum* on the socio-economic conditions of *jhumias*:

.....

44. Suggestions to sustainable development: .....

.....

.....

.....

APPENDIX - II

Plate 1 : A Jhum field just after burning down of dried vegetation in Ukhrul District

Plate 2 : A Jhum field just before the cropping is done in Ukhrul District

Plate 3 : Hill Slope where burning down of vegetation and collection of fuel wood is seen.

Plate 4 : Totally deforested steep hill slopes on both side of a stream in Ukhrul District.

Plate 5 : Another steep hill slope which is entirely deforested in Ukhrul District

Plate 6: An abandoned Jhum field in Ukhrul District (small huts are seen which were used in Jhuming operations)

Plate 7 : A hill slope where Banana plantation are doing in Nungbi Khullen of Ukhrul District.

Plate 8 : Flood Hazard at Sangaiyumpham village in Manipur Valley

Plate 9 : Flood Hazard at Thoubal Moijing village in Manipur Valley

Plate 10 : Flood Hazard at Lilong village in Manipur Valley